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ORIGINAL ARTICLES.

EYE-STRAIN AND THE PSYCHOSES.[1][2]

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IN studying the influence of eye-strain upon the bodily functions, it is very necessary to know what is meant by this term. It is not found at all in works on psychiatry, and is not mentioned in all recent works on ophthalmology. It is, on the other hand, rather frequently found in medical journals and in semi-popular medical literature. The eye seems to be the only organ which is thus popularly associated with a strain; for we do not hear of ear-strain or tongue-strain, stomach-strain or kidney-strain. Nevertheless, "eye-strain" is a convenient word, and probably carries a fairly definite meaning to most minds.

As I understand the term, eye-strain consists of two kinds of straining. In one case it is the automatic effort of the midbrain and oculomotor nerves to adjust the eye in such a way as to overcome abnormalities in refraction, accommodation and imperfect muscular balance. This kind of straining is largely done unconsciously, just as a person with one leg shorter than another unconsciously adapts his posture and gait to the deformity. This is really an eye-strain proper; it does not involve attention or conscious mental effort, except casually. It is mostly subcortical and is a kind of spinal eye-strain.

The second kind of eye-strain occurs when the eye is more seriously defective, or the receiving apparatus of the brain is fatigued. Then the cortical centers are brought into play. The imperfect vision is appreciated with some sense of its defective working, and a distinct and fatiguing effort is made to supplement the ordinary mechanism of the eye, and a sense of this effort, to the point of distress, may result. This attempt may not be distinctly recognized as an effort for better vision, but only perhaps as something wrong, which requires adjustment. This is the kind of eye-strain ordinarily meant, I presume, when the term is popularly and correctly used. It will be seen that eye-strain of this second kind is really a brain-strain. And it seems to me that it is only this kind of strain which can do any widespread harm. As long as eye-defects are automatically regulated by the machinery of the oculomotor nerves and midbrain, there will be no serious consequences, any more than a person with a somewhat shortened leg will suffer much as long as the shortening is so slight that it calls for no voluntary effort to help each step along. At least, it is only when a patient's brain becomes seriously weakened or tired by some additional trouble that the ordinary limp may become a real discomfort.

The further inference is, in my opinion, that many, perhaps most, minor ocular defects *may* exist without doing any harm, the organ compensating perfectly, like a leaky heart. (Over 75 per cent. of school children have refractive errors.)

Since real eye-strain is a kind of attention or brain-strain, it is quite easy to understand that it can lead to disagreeable results along various lines.

My task is to inquire what influence this cerebral eye-strain plays in the psychoses, or morbid mental states.

There are two groups of psychoses: one includes the insanities, technically speaking, in which responsibility is lost or custodial care required.

The other includes the minor psychoses, which embrace those forms of morbid activity of the mind displayed in hysteria, the neurasthenic insanities, morbid fears, doubting manias, imperative impulses, and compulsive acts; also in dipsomania, sexual perversions, erratic types of character allied to paranoia, as well as various hypochondriacal and abortive melancholic states. These are often grouped as neurasthenia. But neurasthenia is a condition which, I think, is relatively rare, for most or many neurasthenias are only psychoses of a minor grade.

Now, with reference to the effect of eye-strain in producing the major psychoses. Alienists, I think, without exception, do not recognize eye-strain, even as a contributing cause. I cannot find any systematic writer who even refers to it. In the last edition of Kraepelin (1903), and in the monumental work of Ballet (1903), of 1,500 pages, no reference is made to the subject.

Some years ago, as Dr. Mabon, formerly superintendent of the St. Lawrence State Hospital, informs me, a serious attempt was made by a competent oculist to help or cure cases of insanity in the hospital under his care, by attention to the eyes. But the oculist failed. About six years ago Dr. Coikendyl made similar experiments at the Willard State Hospital, and claimed some successful results. I am not prepared to deny his success, but I know that the hospital physicians did not share his opinion as to the value of his work. Some years ago oculists were appointed to the State hospitals of New York, and have done good work in relieving obviously defective conditions, but not in curing insanity.

My own experience has made me watchful for

[1] Read before the New York Academy of Medicine March 17, 1904.
[2] Received for publication March 28, 1904.

eye-defects in psychoses and neuroses, for I was one of the committee appointed some sixteen years ago to investigate the importance of Dr. Stevens's views in regard to eye-strain in epilepsy and chorea. The results of my observations have been small. I have seen a few cases of eye-strain, however, with apparent bad results mentally, in students at the secondary schools, where the young men really work hard. In them it seemed as if the eye-strain really led to a kind of exhaustion psychosis. These boys did not get migraine, or headache especially, but there was actually brought on, by close application to books, a mental confusion and exhaustion, so that they simply could no longer read, or study, or remember. This condition was accompanied with some apathy and depression and lack of general interest, so that they no longer cared even for their outdoor sports and amusements. The eyes showed refractive errors and secondary muscular strain. Recovery came very quickly in most cases after rest and proper glasses. In one case only was the exhaustion so marked and prolonged that I feared the development of dementia præcox.

I must add that these cases are very rare in my experience; the eye-strain usually showing itself only in discomforting local conditions. Nevertheless, I believe it wise to have the eyes of psychopathic children, who do not study or who do study very hard, carefully examined.

Again, in men in the forties, who are applying themselves closely as teachers or at some clerical occupation involving fatigue to both mind and eye, presbyopia comes on insidiously, and sometimes a condition of mental depression and irritability amounting to a mild kind of melancholia may develop. Here, no doubt, the eye-strain plays a considerable part. But these cases, too, are rare.

With regard to eye-strain and the minor psychoses, I might say a good deal, but as what I call the minor or neuropsychosis is usually called "neurasthenia," I should be encroaching on the field of others.

I can only say that after sixteen years of watching, I have found hardly any cases in which eye-strain is an important and direct factor in establishing even a minor psychosis, though it modifies its symptoms and secondarily adds to the disturbance. For example, in the hysterical, paralysis of the ciliary muscles may cause microscopy, spasm may cause macroscopy and accommodative disturbances may cause polyopia.

Dr. Gould, in his biographical clinics, gives sixty-eight reasons why success is not always obtained in treating the eyes of these cases, and to this I can only say that success is generally obtained without treating the eyes. In fact, the visual function is largely automatic and spinal, and when the mind is a good mind, the visual machinery does not overthrow or directly and seriously affect it. When the mind is unstable, or the body weakened, cerebral eye-strain plays its part; and when the mind is unstable and the visual machinery is very poor, even spinal and midbrain eye-strain may do some harm.

This is all that my experience or study can add to this subject, and I am not sorry that, in fact, the results are so meager. Perhaps after all the most real psychosis connected with eye-strain is that shown by a group of enthusiastic oculists who have become obsessed with the idea that eye-strain forms the background of most pathological conditions, and, like Bishop Berkeley and his tar-water, think that the whole material universe is nothing and eye-strain is everything. With due respect also to my learned colleagues, I should suggest that "glassing" had become something of, at any rate, a minor psychosis. For if it is sometimes underdone, it is oftener enormously overdone, as witness the spectacular prosperity of our modern opticians. For my part, though, I heartily believe that eye-strain should be carefully looked after, I do not think that our mental balance and nervous well-being are so entirely at the mercy of slight defects in an organ that has been perfected by millenniums of use and misuse.

MIGRAINE AND SICK HEADACHE.[1][2]

BY COLMAN W. CUTLER, M.D.,
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MIGRAINE is clinically considered by most writers a paroxysmal neurosis, having as its chief symptoms headache and a variety of sensory manifestations, characterized also by heredity, periodicity, and commencement in early life. From another point of view migraine or sick headache[3] may be regarded as the manifestation of an unstable nervous organism, influenced in many cases by various peripheral excitations, and it may be assumed that these, or rather their anatomical bases, are frequently transmitted from one generation to another in members of the same family, and form the hereditary feature upon which stress has been laid as an essential characteristic of migraine. It is evident, also, that the periodic attack cannot characterize migraine, for periodicity does not exclude a constant cause. In Jacksonian epilepsy the cause is constant when it follows a fractured skull for instance, although the symptoms are in the highest degree periodic.

Much has been written, of late, on the subject and little has been added to our knowledge of the disease. The confusion that exists is increased by unwarranted dogmatism shown by writers who assume a certainty which the indefinite nature of the disease and the lack of all pathological data do not justify.

It is common to find sick headache in many members or even generations of a family handed down with fatalistic expectations of its inevitableness, as if it were a family skeleton or an ill-omened heirloom. These headaches are strikingly similar in detail, having as many points of resemblance as family features. For instance, it is common to hear that in a certain family the head-

1 Read before the New York Academy of Medicine March 17, 1904.

2 Received for publication April 9, 1904.

3 Gowers ("Diseases of the Nervous System," Vol. II, p. 853) says that sick headache is always migraine.

aches are preceded by visual aura of the same type, or that the headaches begin in the same part of the head, or that the gastric symptoms predominate. It is relatively uncommon to find any variation of the type of disease, such as alternation of epilepsy and migraine in other members of the family. Moreover, in the experience of the writer, migraine is not more common in families with bad ancestry, such as alcoholism, than in those which are above reproach, and this, also, differentiates it from epilepsy, which is recognized as a disease often replaced by other grave neuroses or other degenerative disease, and in its idiopathic form pointing pretty directly to a guilty ancestry. And, finally, few claim that epilepsy can be influenced by treating the eyes or other peripheral organs, while many cases of sick headache are so relieved. The point made is that migraine is distinct from epilepsy, and that it is directly hereditary with a similarity in families which points to a specific cause.

Now, the fact that ocular defects are handed down in families with great uniformity is so common in the experience of every oculist that it needs no especial proof. Astigmatism is not infrequently similar in kind and in axis; muscular faults are also passed on in the same way by parents. Putting these facts together, namely, the heredity of migraine of a fairly constant type, with the transmission of certain forms of ocular defects in members of the same family, the correction of which in some cases relieves the sick headache, and we have a fair basis for the assumption that sick headache, having all the clinical features of migraine, is often a reflex neurosis of ocular origin. No doubt there are many other sources of peripheral irritation—the pelvic organs, nose, digestion—which need not be discussed here.

The question I wish to raise is this: Is there such a thing as idiopathic migraine, or can we assume that where no peripheral cause is apparent, the fault is in our defective means of diagnosis? Two obstacles to a solution present themselves: (1) A mistaken or confused idea of migraine; and (2), imperfect methods of diagnosis. There are many sick headaches, which although periodic, occurring in many members of the same family, and having clinical features of a classical attack, can only be differentiated from a hypothetical true migraine by the fact that they follow some obvious peripheral cause, and are relieved when that is removed. But those who suffer in this way are subject to attacks from irritations disproportionately small. Thus, where a patient has sick headache, and is relieved by the correction of half a diopter of astigmatism, the fault is not with the eye primarily, but with the unstable nervous system which made him susceptible, and it is into this that migraine resolves itself. But the fact remains that the disease must be approached at the periphery and the hope of success increases as our diagnostic and therapeutic measures become more perfect.

This leads to the second consideration: There are in the experience of every physician, even the most sanguine specialist, many cases of inveterate sick headache which persist in spite of the most varied efforts, and which require the use of small doses of morphine to make the attacks bearable. Such cases occur, in part at least, in adults in whom the disease was neglected during its earlier stages, until the headache habit was formed. This expression "headache habit" seems useful, and does not beg the question.[4]

In some of these sufferers an early correction of some peripheral fault might have prevented the welding of the vicious circle. It not infrequently aids, even at a late date, but in other cases all attempts seem futile, and we are tempted to accept the visitation as inevitable, and to limit the treatment to the attacks.

I wish to protest against this attitude, as a weak confession of our incompetency, and I venture to assert that, as a knowledge of these cases is developed, hereditary migraine will be recognized as a reflex neurosis, consisting of an unstable organism excited by certain peripheral strains which themselves form the hereditary influences. The chief danger in the passive acceptance of the idiopathic idea is that we thereby relinquish all efforts to determine the exciting and removable factor in the etiology.

An attempt to determine the proportion of cases due to different peripheral faults would be difficult. All avenues should be tried in turn, beginning with the one in which the strain seems most obvious, but this apparent predominance of symptom is often misleading. Not infrequently sick headaches in which the digestive disturbance is conspicuous, turn out to be due to eye-strain, but there is apt to be a sequence of events which will be suggestive. Again in those who are anemic and worried, with insufficient sleep, the eyes will give out, but a correction of their defects will not relieve the symptoms unless the general hygiene is improved. In some obstinate cases it is possible that the periodic attacks are due to triacid intoxication, as is believed to be the case with cyclic vomiting, although the type of headache may resemble that helped by other treatment.

The site and character of the headache, and the presence or absence of visual symptoms such as scintillations and transitory amblyopia is of little value in diagnosis. It is often stated that an ocular headache begins in the forehead or temples, but it is often found in the occiput or the back of the neck, with some tenderness of that region, so that the patient states that he cannot lie on the back of his head during the headache.

It is very common to find a dull pain following eye work, not infrequently most severe on awakening, filling the intervals between the paroxysms. This may yield to glasses and the intervals grow longer, and in some cases the attacks may cease, showing that the condition was cumulative, and that both kinds of headache were due to a common cause; or the dull, or more constant pain may be relieved and the paroxysms may continue,

4 Gowers, *loc. cit.*, p. 839.

indicating that there is a double cause, or else that the periodic attack is a habit which remains after the cause is removed.

It will be seen that migraine should be studied statistically, not only with regard to its prognosis and the results of treatment, but as regards its natural history, and data to be valuable must contain information regarding the family history and the family anomalies of structure, as well as the character of the attacks and their relation to different kinds of strain.

When this is done there remains a broader and less definite consideration. Many patients respond to very slight excitation while others bear large burdens of uncorrected astigmatism or nasal obstruction or other peripheral strain with impunity, so that the vague personal equation is at the root of the trouble.

That the neuropathic tendency which includes epilepsy and other grave degenerative conditions also includes migraine as a frequent accompaniment is obvious, but it does not follow that the vast number of patients with sick headaches with all the earmarks of migraine, including the visual aura, paresthesia and aphasia, or their families, need fear the development of epilepsy. Many writers claim that so-called ophthalmic migraine, or the form associated with scintillating scotoma, transitory amblyopia, and not infrequently with paresthesia and aphasia, is often a precursor of epilepsy. In speaking of ophthalmic migraine, the disease sometimes called ophthalmoplegic migraine is not referred to, as that has nothing to do with migraine.

In order to obtain the opinion of a man whose experience with epilepsy has been enormous, I have asked Dr. Spratling, Superintendent of Craig Colony, for his views. He writes: "In my experience migraine is an exceedingly rare equivalent of epilepsy, and ophthalmic migraine is equally rare. . . . I have never seen such typical instances of it as have been described by Brunton." Dr. Spratling states that it is the custom in taking histories of epileptics at Craig Colony to inquire regarding the occurrence of migraine in the individual and the family.

Epileptics show the most varied structural anomalies, astigmatism and faults of the ocular muscles are among the stigmata of degeneration, but it does not follow that these defects in themselves point to a neuropathic tendency, for in a far greater number of cases they occur in average individuals—and this I believe to be the case with migraine.

It is a thankless task to attempt to define migraine. On one side the clinical picture overlaps what has been called sensory epilepsy, and on the other it merges insensibly into the many forms of sick headache or pseudomigraine. The feature which appears to characterize it in the eyes of neurologists is that true migraine is inseparable from a neuropathic constitution, of which it may be the only manifestation, and this dependence of a clinical entity upon a vague substratum which is a constant, leads to the assumption, which I believe to be unjustifiable, that the former is also always a constant, a part of the personality.

If periodic, hereditary sick headache is, in a given case, the chief manifestation of this neuropathy, or is associated with certain stigmata which are not unknown in generally normal or average people, we are forced to say that its classification first depends on its failure to respond to treatment, and until all measures have failed no case can be called true migraine, and even then we have as much right to believe that the fault is with our imperfect knowledge, as others have to state that because it is linked with permanent structural conditions, it is thereby a fixture. I do not refer to cases in families in which epilepsy or other grave neuroses are present. I merely desire to call attention to a rather naïve way of reaching a conclusion. If conclusions may be drawn from the descriptions of writers like Gowers, it does not seem probable that migraine very often occurs spontaneously, as is the case with epilepsy. The unstable organism, the gift of an ancestry which had failed to adapt itself to its environment, predisposes, but usually there is a story of stress of some kind in the individual, which precedes the attacks, and if this can be relieved or the environment adapted to the individual, the sick headache ceases. No doubt the neuropathic tendency remains and may manifest itself again in the same way or in other ways, but the condition is relieved even if, in the broadest sense, it is not cured.

It would not be necessary to dwell on this point except that many writers, especially of the French school, fail to make a clear distinction. They have taken the most complex forms of nervous disease, and by analysis have obtained all the phenomena composing them, which they group together with brilliant generalization, but they thereby ignore minor differences of type which are essential. In other words, sick headache may and often does form a part of the neuropathic constitution, but only by association with other factors, and it is justifiable to consider as true migraine cases which, because of their broader neurologic significance, are more often seen by the neurologist, and it may be wise to limit the name migraine to these cases. But the majority of cases of sick headache, periodic and hereditary, with or without aura, occur in average people and may be called benign migraine or simply sick headache, or secondary migraine, if, as I have stated, there is in most cases a probable causal factor to be sought. Or else we adopt the *reductio ad absurdum* of Moebius who says "The tendency to headache is a part of the degeneration which is inseparable from civilization."

New York School of Clinical Medicine.—It is re- staff of the New York School of Clinical Medicine, in staff of the New York School of Clinical Medicine in West Forty-second Street, has been effected. The full details of the changes have not as yet been announced, but it is expected that a complete faculty will be chosen shortly.

THE RELATION OF EPILEPSY, CHOREA AND OTHER MOTOR DISTURBANCES OF THE NERVOUS SYSTEM TO EYE DISEASE.[1][2]

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THE special task assigned to me on this occasion is to discuss the relation of diseases of the eyes to those few functional nervous disorders which are characterized by motor phenomena. This would limit the consideration chiefly to the bearing of ocular disturbances upon the development and occurrence of epilepsy, of chorea, and of the convulsive tics. It is so easy to juggle with figures whether intentionally or not, that mere statistical inquiries have never been to my liking. Instead of offering you numerical data, I propose to state in conscientious fashion a few conclusions which have been reached after years of experience.

I wish I could assume the attitude of the judge who, after listening to long harrangues, has a right to say to the jury "No case," and thus cuts off all further discussion. Let us confess frankly at the outset that the dependence of these motor neuroses, to use a convenient term, upon diseases of the eye, has been greatly exaggerated. Cases in which such dependence could be satisfactorily shown to exist are very few indeed, and the cases in which these neuroses have been cured by treatment of the ocular condition are fewer still. There are so many loopholes by which fallacies in the argument may creep in, that unless one is very careful one's judgment is apt to be warped.

It is curious that the claim of a relation of ocular affections to epilepsy and chorea is maintained chiefly by American writers; by oculists and pseudo-oculists rather than by neurologists. In the larger monographs issued within the last ten years in Germany, in France, in England, and in this country, in which the subjects of epilepsy and of chorea have been exhaustively treated in a truly scientific spirit, mention is barely made of the influence of muscular insufficiency, of marked errors in refraction, or of any other ocular derangement upon the development of the nervous diseases which we are now considering. It must be well known to you that the Stevens Commission of Investigation,[3] appointed some fifteen or sixteen years ago by the New York Neurological Society, in a report which was signed by Seguin, Dana, Starr, Birdsall and others, stated in unmistakable terms, that after careful investigation of fourteen test cases, not a single instance could be cited in which the cure of a genuine epilepsy had followed the relief of any one of the many "phorias" with which the oculists are pleased to puzzle us. My own experience since that time, and I am certain the experience of the majority of the neurologists, has borne out the conclusions of that special investigation committee.

From time to time advocates of this special doctrine of the relation of the various phorias to epilepsy have appeared; such evidence as they have furnished appears to me to be wholly untrustworthy. In September, 1902, an article was published by A. L. Ranney on "Ten Instructive Cases for the General Practitioner Proving the Powerful Influence of Eye-strain."[1] It will not be necessary to controvert this article or to criticize each one of these ten cases, but the character of the paper is well shown by the first case which is put down as one of "absolute mental failure," and mention is made of the fact that a previous diagnosis of cerebral "softening" had been made in a man of forty-one years of age. No data are given to prove that any such cerebral softening existed, nor is any attempt made to state the possible cause of the cerebral softening. The man is said not to have visited his place of business or even paid his bills for six months prior to his examination by Dr. Ranney. He presented such serious symptoms as neuralgic attacks in the left eye and left side of the face for twenty years and also suffered "from flowing of tears over both cheeks in cold weather." (It is astonishing that some of us have escaped the cutting of our muscles during the past winter.) In view of these serious symptoms the author states he "could not divest himself of the firm conviction that organic brain disease existed and that the case was probably incurable." It does not matter what the nature of this "organic brain disease" was. Evidently the author thinks it sufficient to state that after "a graduated tenotomy of the left superior rectus muscle, as a step toward the correction of the four degrees of manifest hyperphoria, the patient, although he had been much troubled with insomnia before the operation, slept without awakening the first night after the operation," and the "absolute mental failure" of former days disappeared at once after this remarkable operation.

In a case of epilepsy which the author quotes with especial delight, it is stated in the history that the patient had been in the habit of having free intervals from nine weeks to four years; after the operation he had an interval of three years and eight months when the case was reported, and the cure is said to be due to the operation. Another one of these remarkable cases is that of a man who at the age of thirty, and never before, had three or four attacks (note the accuracy of the statement) of grand-mal. His ocular condition was treated and the attacks disappeared. As though three or four convulsive attacks in a man of thirty years proves the existence of a genuine epilepsy? In this entire article there is not a single case that will stand the test of scientific criticism, but since this same author finds that he can cure diabetes by the relief of eye-strain and endeavors to explain this cure by the fact that the "centers which control the movement of the

1 Read before the New York Academy of Medicine at a Meeting held March 17, 1904, under the auspices of the Section on Ophthalmology.

2 Received for publication April 5, 1904.

3 *Journal of Nervous and Mental Disease*, Vol. 14. New series 1889.

1 *New York Medical Journal*, Vol. 76, 1902.

eyes are situated in the medulla in close anatomical relationship with the diabetic center," whereas such centers are far away from the medulla, we can understand the value of such contributions to medical science.

I would not have referred to this paper if it had not been published in one of our prominent journals and if it had not been accepted by a large number of medical practitioners as evidence of the relationship between eye-strain and several of the more serious motor neuroses. It is surely to the credit of the best authorities on ophthalmology that they have taken but scant notice of these peculiar literary productions.

In the last report of the managers and officers of the Craig Colony for Epileptics,[1] dated October 1, 1903 (p. 46), the superintendent, Dr. Spratling, records the fact that Drs. Gould and Bennett were given the opportunity of carefully examining and fitting 68 patients at the Colony with glasses. While these gentlemen in an article of their own had laid much stress "on the enormous proportion of cases of injurious astigmatic and anisometropic defects among epileptic patients" they were given full opportunity to put their doctrines to a test.

Dr. Spratling gives a table in which he shows that out of the 68 cases only one derived any benefit in his disease while wearing glasses, and the table which he includes in his article is a most instructive one, which might well be read most conscientiously by all those who may in future be inclined to follow this line of work. To be sure, Dr. Gould said when the unsatisfactory results had been brought to his notice, that the results "did not affect the fundamental fact that in a certain proportion of cases the cause, or the contributing cause, may be, and is, eye-strain." He seems to regret that the younger epileptic patients have not had the constant attention of an oculist or an optician. If an author maintains such a purely unscientific attitude there is no good excuse for attempting to argue with him. When he is driven into a corner he simply attempts to fortify his position by announcing that "if proper glasses could be given as a preventive measure in young epileptics and the care of oculist and optician insured, I have no doubt that epilepsy could be warded off in a certain number of cases." Enough has been said on this subject to show that the theories advocated by these oculists with extreme views are entirely untenable.

While, as recent discussions have shown, there may be some doubt in the minds of those who are competent to discuss the subject of epilepsy, as to whether or not it be of organic origin, all are agreed that true epilepsy is a serious chronic affection of the nervous system, due to some deeply rooted changes, and that the effect of such changes becomes manifest early in the life of the patient; that the disease continues to exhibit its full force for many years increasing in severity, as a rule, and often brings about a deterioration of the patient's mental condition. That this deterioration may in part be hastened by the long-continued use of sedative drugs we must admit, but this has no bearing upon the consideration of our special subject. It is furthermore true that of all the cases of epilepsy only a relatively small proportion have been found to be curable by any known therapeutic measures, and if we may credit, as well we may, the recent reports of the physicians in attendance at the Craig Colony, the regular, systematic life of the inmates of that Colony contributes more to a cure or to a relief from the manifestations of the disease than any other agencies which have heretofore been employed.

If we wish to prove that epilepsy is due to some disease of the ocular muscles, or to some other disturbance of the eyes, the argument must rest upon evidence that such ocular disturbance has existed as long, if not longer, than the epilepsy itself, and that with the correction or the cure of the ocular trouble, the epileptic attacks have ceased. If we cannot produce such evidence, we can at most maintain that in a person who has from some other cause developed epilepsy, either through inheritance or possibly through early cerebral injuries, the ocular disturbance has led to individual epileptic attacks, just as in some persons predisposed to epilepsy the onset of an acute contagious disease might give rise to convulsions, as in others the presence of an intestinal parasite might do the same, or as in some others the accumulation of poisonous products in the gastro-intestinal tract might give rise to serious convulsions.

The question of paramount importance, however, is not what causes the individual attack, but what brings about the predisposition to such attacks, and in this instance the predisposition is the disease itself. A just inference from this argument is, that if an epileptic patient presents any marked physical disturbance, whether it be a nasal obstruction, a narrow prepuce, a discharging ear, whatever physical disturbance he may present, let that condition if possible be remedied, for it may be the exciting cause of the individual epileptic attack, but do not let us suppose for an instant that the existence of such physical condition is the actual cause of the epilepsy. It may aggravate the disease, but it has not originated it.

I am willing, therefore, to grant that it is but fair that the patient suffering from epilepsy should be given the advantage of most careful examination by a competent and unbiased oculist, and that errors in refraction, muscular insufficiency and the like, should be properly corrected. If we proceed one step further and ask whether these measures are generally successful in inhibiting attacks, I make free to answer that from my own personal experience I do not know of a single case in which the epileptic seizures have been altogether inhibited or even diminished in number by the wearing of glasses, by the cutting of muscles, or by any other ocular measures

1 Cf. Editorial in MEDICAL NEWS, March 19, 1904, p. 560, which appeared two days after this article was read, and independently of it.

which had been adopted. That this practice is frequently resorted to is attested by the fact that it is rare to find a case of chronic epilepsy, at least among private patients, that, in addition to the bromide acne, does not also betray the disease by the wearing of prisms. It is fortunate, indeed, for the patient, if he have not also some ocular palsy as the result of the overzealous care on the part of the oculist. I am fully aware that such zeal is founded, as a rule, upon an earnest desire to help the patient. But I have stated my own impressions rather bluntly, because as a neurologist I wish to elicit definite statements from competent oculists as to the actual benefits that have been derived to their knowledge from the treatment they have given epileptic patients.

If the ocular treatment of epilepsy were an entirely innocent affair, there would be little reason to protest against it, but in some instances more harm than good is done. I have in mind the case of a teacher who consulted me years ago, after he had been subjected to all sorts of treatment, including the cutting of his eye muscles. Up to that time he had been the victim of nocturnal epilepsy which had never interfered with his professional work. At the instance of some overenthusiastic friends, he was advised to abandon all previous treatment and to consult an oculist who promptly gave him the benefit of his surgical skill, which brought about no diminution of his attacks, but resulted in a double vision which was far more annoying to the teacher than the previous nocturnal attacks had been.

The confidence of some oculists has been so great that they have committed the serious error which the late Dr. Seguin pointed out many years ago, of abandoning all medicinal treatment and thus encouraging the occurrence of epileptic convulsions. There is surely no warrant for any such procedure; however confident the oculist may be, and I repeat there is little excuse for such confidence, it is well to continue the exhibition of drugs until the patient is well over the effects of surgical interference; then, by cautious diminution in the amount of bromides or of other drugs exhibited, let the oculist, if of unbiased mind, carefully determine whether the cutting of muscles or the wearing of glasses has been of any benefit whatever and if convinced that such procedure has not been beneficial, why not state frankly to the patient that he must resort to the old-fashioned medicinal treatment and not depend upon surgical procedures? A little conservatism in this matter will accrue to the advantage of the patient and to the ease of conscience of all honest oculists.

What has been said of epilepsy applies with equal force to the relation of eye-strain and other ocular conditions to chorea minor, or Saint Vitus' dance. Although the morbid pathology of chorea is still a matter of dispute, it is another one of the general neuroses, implying very serious disturbance of the nervous system. It follows upon severe shock, upon emotional strain, and its relation to acute rheumatism and endocarditis suggests that it may, at times, be of infectious origin. The idea that it might be due to some slight lack of adjustment in the ocular apparatus is too absurd to be considered even for an instant. The advocates of this theory may, perhaps, claim that ocular insufficiency may as well as not be considered one of the possible reflex causes of the disturbance, just as some overenthusiastic and unscientific physicians have occasionally attributed chorea minor to nasal obstruction or to some disturbance in the sexual sphere both of boys and girls, but even of this reflex origin of chorea there is very little sound proof. If true at all, it is only fair to say that the conditions just referred to may possibly prolong an attack of chorea, but I am yet to find a single case that furnishes indubitable evidence of the fact that Saint Vitus' dance was actually cured by the treatment of any one of these conditions.

There is, however, one other disease which, to my thinking, is entirely distinct from Saint Vitus' dance, but which bears a superficial resemblance to it, and may sometimes be caused by some eye-strain. This is the condition known as "habit chorea," characterized in some by blinking of the eyes, by curious movements of the nose and face, in fact, by all forms of grimaces. In others it is characterized by irregular movements of the shoulder muscles, of the head, the hands, or, for that matter, by irregular movements of any part of the body. This condition is apt to be a very chronic one and the name "habit chorea" is well chosen, for the impression that one obtains from these cases is that the habit is formed, although it may originally have been engendered by some special slight morbid condition. In these cases of habit chorea, I thoroughly believe that it is well to have the patient carefully examined for his ocular as well as for his nasal condition and any existing defect, however slight, remedied. It is these cases of habit chorea, and not cases of Saint Vitus' dance, that are relieved by such treatment as a competent oculist may suggest. It is hardly necessary to urge great care in this matter, for this special form of treatment has also been over-done. Little discrimination has been shown and choreic patients are wearing prisms very much more frequently than the condition would seem to warrant. Let a careful distinction be drawn between habit chorea and chorea minor.

Habit chorea and convulsive tic are, as far as the symptoms go, not very unlike each other, although the latter is a much more serious neurosis. Facial spasm, which is perhaps the best single example of convulsive tic, at times develops after some great emotional strain and is acknowledged by all to be rarely of reflex origin. Altogether, the more one examines into the reflex causes of well-known neuroses the more firmly is he convinced that it is always hazardous to attach undue importance to such etiological factors, and so I would consider it a sheer waste of time to attempt to prove or to disprove any bearing that an insufficiency of the ocular muscles might have upon the development of convulsive tic. Let

those who may be anxious to put this special etiological factor upon a high pedestal, furnish evidence of this relationship, the burden of proof rests upon them.

Summing up all that can possibly be said with due regard to truth, it may be stated that the relationship between ocular affections and epilepsy, chorea, and convulsive tic, may be a close one in the minds of some "faddists," but it must remain a very remote one in the minds of those who have no special axes to grind and no particular therapeutic territory to exploit.

21 East Sixty-fifth Street.

THE EYE SYMPTOMS OF HYSTERIA, NEURASTHENIA AND THE TRAUMATIC NEUROSES.[1][2]

BY WARD A. HOLDEN, M.D.,
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THE functional eye disturbances found in neurasthenia and hysteria are not always characteristic of one condition or the other, since the minor eye disturbances common in neurasthenia are found in hysteria also. The eye disturbances of traumatic neurasthenia or hysteria do not differ particularly from those of the non-traumatic varieties. Hence in describing these symptoms it is not necessary to classify them according to the underlying neurosis or psychosis.

The morbid states which give rise to the symptoms we are concerned with are as follows: First, the cornea and conjunctiva may be anesthetic or hyperesthetic; second, the eye muscles may be relaxed from fatigue or, on the contrary, be in a state of spasmodic contracture; and, third, the visual perceptive apparatus may show signs of fatigue, while there may be also psychical perversions of visual perceptions.

We may perhaps best cover the subject in the short time at our disposal by describing the functional disturbances as they would be brought out in a routine examination of the eyes.

The patient's subjective complaints are mostly of pain and parasthesia in various parts of the head after using the eyes, of clouds or bright spots before the eyes, and of an apparent increase or decrease in the size of objects seen. Furthermore, after reading for a length of time the print may seem to fade away because the muscles of accommodation relax from fatigue, or the print may appear doubled because convergence cannot be long maintained, or the lines of print may seem to flutter and become confusing because of the duration of their after-images in the fatigued retinas is abnormally prolonged.

On inspection a fine tremor of the lids is always noticeable when they are gently closed. There may be lacrimation, although the eye presents no signs of inflammation, and also photophobia, which causes the patient to let the upper lids droop over the pupils. This droop occurs also as a symptom of fatigue as the examination proceeds, and to overcome it one must from time to time sharply admonish the patient to keep the eyes wide open. Sometimes this ptosis of one or both upper lids may be considerable, but it is easily distinguished from paralytic ptosis, and the patient not only may fail to raise the lid when directed to do so, but also may forcibly resist the examiner's effort to raise the lid with his finger. Besides this partial closure of the lids there may be complete forcible closure in one eye or both from distinct spasm of the orbicularis muscle.

The reflex closure of the lids when the cornea or conjunctiva is touched is frequently slow or wanting, indicating anesthesia of these parts; and this anesthesia is likely to be more pronounced in the eye having the more marked disturbances of vision or on the side corresponding to a general hemianesthesia.

The pupils are usually normal in size and in reaction, although in cases of hysterical blindness they may be large and unresponsive.

The extra-ocular muscles often exhibit a lack of balance and particularly a varying latent divergence or exophoria, which may be regarded as a sign of fatigue from convergence. Again, a spasm of any of these muscles may give rise to diplopia, which might suggest an actual paralysis, but the anomalous behavior of the double images in different directions of the gaze and the presence of corroborative symptoms lead us to the diagnosis of a purely functional disturbance. As an example of this I may cite the case of a girl of twenty years recently examined, who complained of having seen double for several days. The eyes converged slightly. She had homonymous diplopia with the images level and an equal distance apart in all directions of the gaze, a condition not to be explained by a recent paralysis. Furthermore, her corneas were anesthetic and her color fields contracted. A diagnosis of hysterical spasm was made. When examined two days later the muscles were in perfect balance and no diplopia could be elicited.

Diplopia of another sort and of a purely psychical nature is absolutely characteristic of hysteria and is a very valuable diagnostic sign when it exists. This is uniocular diplopia. With one eye closed the patient sees a light double, when it is carried a certain distance away from the eye, and when asked to count fingers he sees double the number presented. This symptom was of value in the case of a man of thirty-five years who came to the Vanderbilt Clinic three months ago complaining of failing vision. He saw $^{20}/_{60}$ with each eye, the fields of vision were concentrically contracted, the optic disks were pale, within physiological limits, and the knee-jerks were unequally exaggerated, all suggesting atrophy of the optic nerves. Two weeks later he returned with a new card and I saw him. The pupils were normal, the fundi were apparently normal, and retinoscopic examination showed him to be emmetropic. When asked to read the distant test letters he hesitated. His left eye was then covered and I held up two fingers 15 feet

[1] Read before the New York Academy of Medicine at a meeting held March 17, 1904, under auspices of Section on Ophthalmology.

[2] Received for publication March 23, 1904.

away from him and asked him how many fingers he saw with his right eye. He promptly answered four. When I held up four he said eight, and so on. When the left eye was used alone he gave similar answers. The sensibility of both corneas was found to be reduced. It was then learned that he was bringing a damage suit against a company for injuries he had received several months before. The only possible diagnosis was traumatic hysteria with functional disturbances of vision.

A similar case seen last week was in an intelligent girl of nine years, who had come to the Vanderbilt Clinic and obtained glasses correcting a low degree of myopia. She came back complaining of seeing lights in the distance double. I found that she saw a candle flame single in all directions of the gaze when it was held not more than 15 feet away. When held at a greater distance she said she saw two flames five inches apart and one diagonally above the other in all directions of the gaze. But when one eye was covered the double images were seen exactly as before—uniocular diplopia. Fingers were counted correctly at every distance. With a red glass before one eye while both were open she said she saw two red flames, but casting consistency to the winds, she averred that she saw a red and a white flame when a red glass was held before one eye while the other eye was closed. The sensibility of her corneas was reduced, but the color fields were normal, and her mother had observed no other evidence of neurotic or psychical disturbance. Her future history is likely to be interesting.

The acuteness of vision is usually normal, but the patient often reads the distant letters slowly, and with an effort, and only after considerable urging. There may be even more difficulty in reading small print near by, and the patient will hold the test card close to his face or far away or to one side, assuming cramped positions, and even repeated urging may not make him read the smallest print. But if an indifferent glass, plain, smoked or weakly refracting, is held before the eye the psychical effect is such that both distant and near vision at once become normal or as nearly normal as the patient's refractive condition will permit.

In rarer cases vision in one eye is very poor or the patient may be unable to see at all. But if we employ any of the tests for detecting simulated blindness, which all consists in arranging lenses, prisms or colored glasses in such a manner that the patient uses the eye with supposed poor vision while believing that he is using only the eye with good vision—we find that the sight of the poor eye is in fact normal.

For the still rarer cases in which there is apparent blindness in both eyes we have no test to reveal the actual amount of vision, but the diagnosis can usually be made from the presence of other hysterical symptoms, the previous history of aphonia and the like, and the lack of organic changes in the eyes. The patient, however, finds it too difficult to maintain this fiction long, and usually the vision which was lost suddenly, after a few days as suddenly returns.

Anomalies of the visual fields are the most frequent and the most characteristic eye disturbances in neurasthenia and hysteria. The typical condition if the examination is made deftly without overfatiguing the patient is a normal field for the usual white test object, a concentric contraction of the color fields in their regular order, and a diminution of central color perception in that a small area of color is not recognized as far away as by the normal eye. These anomalies of color perception are to be regarded as evidences of fatigue of the retina or of the psychical centers or of both. If the examination is tediously made or purposely long-continued, evidence of increased fatigue is manifest in further narrowing of the fields, giving them the watch spring or spiral type. That is, if the limits of the field are plotted a number of times continuously, the boundary line recorded will be a diminishing spiral.

Besides the typical concentric contraction of the color fields in their regular sequence there is occasionally a reversal of their sequence, the field for red being larger than that for blue, and occasionally a contraction of the field for white. But rarely is there a central defect in the field or a defect of a hemianopic type. The contraction of the fields is often more pronounced in the eye of the side which is more anesthetic. The size of the fields varies from day to day, and hence a repetition of the examination is often of assistance in making a diagnosis. In order to illustrate the fluctuation in the nature of the visual disturbance I may cite the case of a lady of twenty-five who complained of sudden loss of sight in the left eye. Tests for simulation showed that the left eye had in reality normal vision, and a week later the patient with this eye easily read $^{20}/_{20}$. Two weeks later, however, the vision of this eye had fallen to $^{20}/_{50}$, and there was a central scotoma for colors, which is so unusual in hysteria that if I had not observed the patient's previous symptoms I should have been inclined to diagnose a retrobulbar neuritis. A few days later vision was again normal.

The forms of the color fields in hysteria are sometimes so bizarre that they do not simulate those of any organic lesion, and the diagnosis is then easy. For example, I examined for Dr. Dana a lady with traumatic neurosis after a severe injury in a railway wreck, and found that she had normal fields for the left eye, and for the right the field for white was normal, as was also the field for a 3 mm. black dot on a white ground, the field for which is usually equivalent to that for blue. But with this right eye she perceived colors nowhere except in an area 15° in diameter, a few degrees downward and inward from the point of fixation, and in this area blue, red, and green were all recognized. When examined three weeks later the fields for white and for a 3 mm. black dot were normal in each eye, but colors were recognized only in the left halves of the field and in a small portion of the right halves.

In other words, there was an atypical right homonymous hemianopsia for colors.

It should not be supposed that these functional eye disturbances are common in young women only. Some of the most marked and most persistent disturbances are found in strong men with hysteria following injury or nervous shock, and I will conclude these remarks by describing an attack of hysteria major in a brawny mounted policeman aged thirty-six years. On November 9, 1902, he was thrown from a vicious horse and stunned, but he continued his work without interruption. Two weeks after his fall he began to hear voices while riding his beat, and the arc lamps along the suburban roads appeared, as he expressed it, "like great red bleeding hearts." On December 5, a month after his fall, he became wildly excited and dashing into the station house proclaimed with violence that he was the police captain in command. He was overcome with difficulty and taken to the Bellevue psychopathic ward. Here he continued in an excited state and complained greatly of pains in his head, which sedatives did not relieve. After three days he became rational, but was then unable to see, although his pupils were of normal size and responded promptly to light.

Five days after his admission I saw him and found his eyes so wide open and staring that the condition had been taken to be exophthalmos. The pupils were then large, the left larger than the right, and the response to light was rather sluggish. He had perception of light, but he recognized a candle flame in the nasal portion of each field only. The fundi were normal. Further examination revealed diminished hearing, diminished sense of taste on the left side of the tongue and left hemianesthesia, with some points along the spine so hyperesthetic that when they were pressed upon the patient nearly jumped from his bed with pain.

The staring look continued, the pupils responded sometimes promptly, sometimes sluggishly, and vision improved a little. After the patient had been observed and frequently examined by many physicians, Dr. Dana and others concluded that at that time he was suffering from pure hysteria, and after being kept two weeks longer in the general ward, he was discharged.

On January 31, 1903, seven weeks after his attack, at my request he came to my office for examination. He still had the staring look and could count figures with each eye at a distance of two feet only, and this only in the nasal portion of each field near the point of fixation. With each ear he could hear ordinary speech no farther away than three feet, although the tympanic membranes were normal. Sensibility was diminished on the left side of the body, taste was diminished, and he dragged his feet as he was led about. His condition gradually improved and six months later he was able to read. In January of this year, fourteen months after his attack, I found him in perfect health due, he thought, to his indulgence in violent physical exercise. His hearing was good, taste good, sensibility normal, vision had returned to $^{20}/_{20}$ in each eye, and the only sign of functional eye disturbance remaining was a marked tremor of the lids when they were gently closed.

His persistence in simulating this remarkable condition of the fields was perhaps attributable to the fact that its peculiarity had been much discussed in his hearing at the earlier examinations.

INTRAHEPATIC CHOLELITHIASIS.*

BY EDWIN BEER, M.D.,
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By intrahepatic cholelithiasis is meant the production of gall-stones within the liver in the branches of the two hepatic ducts. In these intrahepatic ducts gravel or bile-sand and real calculi may be found together. In other cases, however, the calculi are found alone, while in still others the gravel or sand alone is present.

From a theoretical standpoint, both manifestations of cholelithiasis are important, but while the calculi seem to be of practical moment, bile-gravel seems, more rarely, to lead to symptoms. The calculi being the adult form of intrahepatic concretions and the gravel being the infant form, most of the remarks that follow, though applied to the calculi proper, will be equally true of the gravel concrements, but as will be evident, at times to a lesser degree, owing to the smaller size of the latter.

Intrahepatic cholelithiasis has been known for a long time and scattered through the literature of more than two centuries are lists of cases. I doubt, however, whether all these cases, the fruit of many years' collecting and observation, would reach a total of one hundred and fifty. The causation of intrahepatic stones, their frequency of occurrence and their other characteristics have received but scant attention, though occasionally authors, especially Körte,[1] have hinted that intrahepatic stone formation might be of vast import in the prognosis of cholelithiasis.

To study these relations I began the present investigation, and have examined a large number of selected cases, which I believe will throw some light on the frequency of occurrence, causation, structure and composition of intrahepatic calculi. That such an investigation is particularly timely, now that surgery is so frequently called upon to deal with gall-stones, no one can deny. Moreover, a recent article from Kehr's Clinic by Berger[2] and a more recent one by Kehr[3] himself, have suggested to me that this whole subject of intrahepatic gall-stones requires a careful study, and may be much more important than medical men in general believe. According to these writers, in the after-treatment of cases of common duct obstruction caused by stones, in an astonishingly large number numerous stones and fragments of stones were discharged from the drained hepatic duct. That all these stones and fragments were not of

* From the Laboratory of Professor Weichselbaum, Vienna.

intrahepatic origin seems likely, but that some were, can not be doubted. The great emphasis that Kehr and Berger lay upon getting rid of all these stones, if recurrence is to be avoided, shows at once how important is the whole question of the production of stones within the liver ducts.

A study of this condition throws light on a great many of the problems connected with cholelithiasis, both those of etiology and therapy. Moreover, an understanding of this condition must naturally have a bearing on prognosis.

A short review of the known facts on this subject is quite necessary. Stones were noted in the liver ducts in the eighteenth century, in fact, even earlier. Glisson found them in cattle, whereas others have described them in man. Morgagni[4] collected the known cases, but up to the latter half and the end of last century cases and facts have been very scarce. Frerichs[5] reports having seen five cases, and in view of his large experience, that is very surprising. Thudichum,[6] who attempted to find the nucleus of many gall-bladder stones in the liver ducts, reports that in five per cent. of the livers of patients suffering from cholelithiasis such stones occur. Most subsequent workers have either ignored or been unable to verify Thudichum's observations. These find that intrahepatic stones are not as frequent as he declared, nor can they with any regularity be traced to the gall-bladder, where they should grow, according to Thudichum, into the gall-bladder calculi. In 1891, Courvoisier[7] collected all the known cases, and in all found 50 in the literature. This meager number, which includes many cases in which gravel and not stones were found, gives a fair idea of the observations previous to that date, though scarcely of the frequency of occurrence of intrahepatic stones, as no investigator seems to have bothered about a systematic study of the question.

Since Courvoisier's statistics have been published, other cases have been reported, and in more recent publications of work along these lines, intrahepatic stones were found more frequently. Peters,[8] for instance, in 161 cases of cholelithiasis, found intrahepatic stones but once. Hünerhoff[9] in 85 cases of cholelithiasis found stones in the intrahepatic ducts once. Schroeder[10] of Strassburg finds intrahepatic concretions in nine per cent. of the gall-stone cases that he reported. The value of these three papers is very slight, as the work is in no wise personal. The papers are reports drawn up from autopsy notes which are spread over a great many years. Schroeder's work, for instance, consisted in looking through autopsy notes, and, judging from his paper, his cases which Naunyn so repeatedly cites, showed calculi only five times. The other eight cases, making his total of 13 or nine per cent., were gravel. The value of all such data is, to a great extent, lost, because the figures can not indicate what really existed, and what might have been found had the ducts in every case been carefully and systematically followed, and the etiological factors investigated. Niemer,[11] Kehr,[12] Riedel[13] and Lenhartz[14] have reported further cases, but no one seems to have looked into the question thoroughly. My results, based on such a study, will therefore be all the more interesting. In my series of 250 cases, I have found calculi five times, and once only gravel in the intrahepatic ducts. In a total of 72 cholelithiasis cases 8.3 per cent. showed intrahepatic stone formation.

These new data go to show that intrahepatic stone formation is not as uncommon as was once thought, and later it will be seen that under certain circumstances this intrahepatic production of stones is a more or less regular occurrence.

Before leaving the question of the frequency of intrahepatic stones, it would be well to state the views of Naunyn and Hoppe-Seyler, who seem to think intrahepatic calculi are even more common than the above data indicate. Naunyn[20] says: ". . . dass sie (Bilirubin-Kalksteinchen) häufig in den Gallengängen der Leber entstehen." Hoppe-Seyler seems to accept a similar frequency. On what these opinions are based I do not know, but they are strikingly in contrast with the other publications just cited.

The highest statistics so far published are those of Schroeder and myself. In eight or nine per cent. of cholelithiasis cases intrahepatic stones were found. (In Schroeder's statistics most cases were gravel.) As in general seven per cent. of corpses, or according to Schroeder's statistics twelve per cent., have gall-stones, intrahepatic stones might be present once in 160 or in 100 cases, respectively. That can scarcely be called a frequent occurrence. Under certain conditions, such intrahepatic calculi are found very frequently, but one might open many hundreds of livers, in which these conditions were not present, and never find a sign of intrahepatic stone formation.

The causation of these intrahepatic stones has always been very obscure. At first the process was explained as mechanical; later a chemical explanation was proposed. Frerichs[15], in 1858, opposed the purely mechanical views, saying that "the simple concentration of bile can not be looked upon as the cause of the precipitation of the substances that go to the formation of gall-stones. These substances remain in solution as long as the bile is unchanged—that is, until the bile had been chemically changed by the action of the gall-bladder mucus." "The beginning of the precipitation of pigment, cholesterin, bile sand, calculi and powder-like structureless deposits are found wherever the liver secretion becomes stagnant and the bile is decomposed." Thudichum,[16] though he thought intrahepatic stones more frequent, interpreted their formation in much the same way. He attributed the production of intrahepatic stones "to a disease of the bile and a partial obstruction of one or more of the biliary ducts. Courvoisier,[17] after reviewing the 50 cases that he gathered, came to no absolute conclusion as to the cause, though he was inclined to think that "obstruction to the flow of bile increases the chances of intrahepatic cholelithiasis." He adds, however, that this is not his own idea, and that in 1580 Caspar Meyer

had expressed the same view, with this in mind Courvoisier thought that in cases of choledochus obstruction, the condition should be relieved early to avoid a secondary intrahepatic production of stones.

In 1892 Naunyn added a new turn to the question of causation. He showed that obstruction, pure and simple, would not suffice, as the intrahepatic stones were made up in greater part of bilirubin and its oxidation products in combination with calcium. This combination never occurs in stagnant bile, if no other factors come into play. These other factors, he thought, were the direct "influence of the living mucosa of the gall-bladder." "Perhaps bacteria are at fault, for they readily wander into the biliary system, when stagnation is present, and cause oxidation of the bile."[18] Though Naunyn, in general, attributes some importance to the effects produced by the poisons of the bile in gall-stone production, he does not expressly state such a cause in this connection. This new factor was first outlined by him at the Tenth Congress für Innere Medizin, and later developed in his book. At the Congress, Mosler,[19] in the discussion, said that intrahepatic calculi must be interpreted as the result of cholangitis. He did not avow the direct action of the living tissue, nor emphasize the necessity of obstruction; nor did he advance any arguments for his statements or proof of them. More recently (1899) Hoppe-Seyler has to a certain extent combined the views of Naunyn and Mosler. He says intrahepatic stones are most frequent in cirrhosis hepatis and also when the common duct, or hepatic ducts, are obstructed by tumors, parasites, or calculi. In these latter cases, the infection of the biliary passages, *i.e.* cholangitis, and the formation of bilirubin-calcium stones, which he adds may become the nucleus of larger stones in the gall-bladder, developed side by side. Naunyn in a note was more guarded, saying: "Frequently one finds in those cases that have intrahepatic stones, general bile stasis throughout the liver, *e.g.*, in tumors, cirrhosis, chronic congestion."[20] Riedel,[21] in 1903, said that intrahepatic stones were rarely primary, but could develop secondarily after obstruction of the ductus choledochus by concretions.

Before closing this review, it must be stated that Charcot[22] attributed the presence of some of the intrahepatic stones, to wandering of stones from the gall-bladder into the ducts. Though Charcot thought of the possibility of stones passing from the gall-bladder through the cystic duct, and then up through the hepatic into the liver, he also acknowledged an intrahepatic development. These, he incorrectly stated, have "jamais . . . la structure radiée, les couches concentriques, ni les facettes qui distinguent les calculs nés dans la vésicule." In 1897, Langenbuch[23] expressed the identical opinion. He opposed Körte's interpretation of Sendler's[24] case,* saying that the stones that were found in the liver, were derived from the gall-bladder, and gained their intrahepatic position, perhaps as the result of aspiration by the liver. Langenbuch will admit the intrahepatic formation of minute bilirubin-calcium stones, but he draws the line at other stones just as Charcot did, without giving any valid reason for doing so.

That stones may occasionally wander into the right or left hepatic ducts and thence into the larger liver ducts when the choledochus is obstructed, can not be denied. Such a case, I myself have seen, finding two gall-bladder stones that had wandered into the first division of the left hepatic duct. But to apply that process to those cases in which the ducts throughout the liver are filled with a large number of stones, as in Sendler's and many other reported cases; or, when the stones are arranged, more or less like graduated beads, the smallest being far in the liver in the hepatic radicles, and the largest near the hepatic duct, is surely going too far. Stones that have wandered must present the shape and size, as well as the composition of the stones that are found in the gall-bladder. To these requirements the intrahepatic stones in all my cases, to be cited later, in no wise conform.

Most writers, on the other hand, have taken so little note of this interpretation, that in their reports no discussion of it or comparison between the gall-bladder and hepatic stones are found. The size of intrahepatic stones is usually smaller than of those found in the bladder; their shape often altogether different, being frequently ovoid, or more or less cylindrical. Their close relation to the walls of the ducts, in which one may find some soft cast-like stones, already composed of definite layers of pigment and cholesterin; their location in some peripheral part of the liver; all these facts preclude a general application of any such interpretation as Langenbuch's. The older stones, as well as some of the younger ones, are often distinctly facetted, and if many stones form in the ducts they seem to conform to the rules that obtain in the gall-bladder and are facetted.

This brief outline will give an idea of the many views that have been entertained, both as to the frequency of occurrence, and causation of intrahepatic stones. As Courvoisier said, the views found in the literature are extreme, and as this seems to be due to the fact that nobody has undertaken the regular examination of a large number of livers, both normal and abnormal, for this particular purpose the above-mentioned difference can be readily understood. Hofrat Weichselbaum kindly allowed me to dissect a large number of livers at his institute in Vienna, for which I take this opportunity to thank him very cordially.*

The livers were obtained after demonstration,

* Male patient, 50 years old. Sick on and off for two years. Pain in the right side. Vomiting—once icterus. One typical gall-stone colic. Developed an abscess in right hypochondrium which closed rapidly after incision, except at one spot, where biliary fistula persisted. One and one-half years later, chill, pain, icterus, vomiting. Bile discharged through fistula in very large quantities. Operation disclosed a gall-bladder full of stones. After discharging many stones the wound closed. Later it opened again as icterus and chill developed. Death occurred two and one-half months after last closure of wound. Autopsy showed a much contracted gall-bladder—several stones in the choledochus. A large number of small and large stones throughout the liver ducts. Some of these were facetted. Their size varied from that of a pea to a cherry-pit.

* Some of the earlier cases were studied in Prague. For the permission to use them I wish to express my thanks to Hofrat Chiari.

and the hepaticus branches were followed to the peripheral parts of the various lobes. Naturally the largest ducts alone could be inspected, and also only a small fraction of the whole intrahepatic duct apparatus, as the following of one duct into the liver substance destroyed many others that lay near it. In cases of obstructive jaundice, or cases of past obstruction of the common-duct, when the ducts were dilated, the following of the intrahepatic ducts is a very simple matter. In other cases, the size of the lumen of these ducts varies considerably, but only when the lumen is extraordinarily small does one find any difficulty. Even here it is readily overcome by practise and care.

In the 250 selected livers that I examined, there were 72 cases of cholelithiasis; of these six had one or more stones in the choledochus with secondary cholangitis. There were four cases of obstruction of the common duct, due to tumor, etc., and secondary cholangitis, without any gallstones in the gall-bladder and large ducts. There were 71 cases of intrahepatic obstruction of the ducts, including metastatic tumors, ten; cirrhoses, thirty; abscesses, four; chronic congestion, twenty-seven. In addition there were amyloid and fatty livers, as well as normal organs.

SUMMARY OF THE 250 CASES.

	Times.		Times.
Cholelithiasis without complications	66	intrahepatic	0
		cholelithiasis	0
" and cholangitis, choledochus obstruction due to stone	5	do	5
" and old obstruction of choledochus due to stone (?)	1	do	1
Tumor or cyst obstructing choledochus and cholangitis	4	do	0
Metastatic carcinoma of liver	10	do	0
Cirrhosis hepatis	30	do	0
Abscess-pyelophlebitis	4	do	0
Chronic congestion	27	do	0
Atrophic-fatty-amyloid livers	39	do	0
Normal livers	64	do	0
	250		6

The six positive cases, as well as the four cases of common-duct obstruction, with secondary cholangitis, are briefly described below:

Case I.—Cholelithiasis, Choledochus Obstruction, Cholangitis, Intrahepatic Calculi and Gravel.—Female; no history obtainable. Autopsy showed very marked distention of the extra and intrahepatic ducts exclusive of cystic duct, chronic cholecystitis, with stones in the gall-bladder, two large calculi in choledochus and hepaticus. These were intensely inflamed and ulcerated. In the distended intrahepatic ducts throughout the liver several hundred calculi and a great deal of gravel. Stones and gravel were yellow in color. Similar deposit about the gall-bladder, and extrahepatic duct stones. The size of the intrahepatic calculi varied from that of a pin-head to that of a cherry pit. Many stones already show signs of facets—some of the larger stones are regularly tetrahedral. Most, however, are ovoid or spherical in shape. The intrahepatic calculi are smaller than the extrahepatic. In the latter is found an almost pure cholesterin nucleus about a central pigment mass, and as said above, this nucleus is covered by a yellow shell of pigment calcium. These nuclei are of the same size in all the extrahepatic stones, and are, in size, larger than the largest intrahepatic stones, which contain no such nucleus, and are almost a pure pigment calcium combination. The liver otherwise negative.

Case II.—Cholelithiasis, Choledochus Obstruction, Cholangitis, Small Black Sand-like Concretions in the Intrahepatic Ducts.—Male, 67 years old; no history obtainable, as patient was admitted moribund and markedly cholemic. Autopsy showed stones in gall-bladder—one stone impacted at papilla. Catarrhal cholangitis, but no pericholangitis. Contents of ducts muco-pus and bile with many small black concretions. Liver otherwise normal.

Case III.—Cholelithiasis, Choledochus Obstruction, Cholangitis, Intrahepatic Calculi and Sand.—Female, 27 years old; four or five weeks fever and icterus; well previously. Autopsy showed six stones in choledochus, which was full of pus; several stones in the hepaticus, multiple abscesses in the liver. In the intrahepatic ducts, numerous calculi and small sandlike concretions. Of the calculi, one was distinctly tetrahedral and as large as a grape pit. All were black. Soft calculi arranged in layers of pigment and cholesterin were found fitting like casts in the intrahepatic ducts. Liver otherwise normal.

Case IV.—Cholelithiasis, Cholecystitis, Choledochus Obstruction, Cholangitis, Intrahepatic Calculi and Gravel.—Female, 66 years old; three and one-half months before death, pressure in epigastrium and occasionally pain, anorexia, frequent vomiting towards evening, stool normal, marked emaciation, no icterus, slight fever (perhaps due to pleurisy) on one day, liver slightly enlarged, gall-bladder region tender, urobilinuria, ten days prior to death icterus developed. Autopsy showed acute inflammation of the gall-bladder, obstruction of choledochus by three stones. Ducts contained pus and erythrocytes, cocci, bacilli, epithelial cells and a large number of non-facetted, hard, yellowish red calculi almost as big as cherry pits (bearing no resemblance to the extrahepatic calculi); also gravel. Liver otherwise normal.

Case V.—Cholelithiasis, Cholecystitis, Choledochus Obstruction, Cholangitis, Intrahepatic Calculi and Gravel.—Male, 65 years old; pain, colic and tenderness in upper abdomen; sick in all about four weeks (anamnesis very inadequate). Autopsy showed general icterus, perforation of the gall-bladder due to ulcerative cholecystitis, four stones in gall-bladder, stone in choledochus, which was filled with pus. Intrahepatic ducts well dilated, containing about 30 pure black pigment stones, most of these a little larger than the head of a pin; one stone elongated, and almost a centimeter in length. Pus and fine pigment particles also present in intrahepatic ducts. Liver otherwise normal.

Case VI.—Gangrene of Lung, Cholelithiasis, no Icterus, Intrahepatic Calculi, no Cholangitis.—Male, 79 years old; history contains nothing about cholelithiasis; patient septic on admission; no icterus. Autopsy showed enormous dilatation of the choledochus, so that at first it was mistaken

for an accessory gall-bladder. No obstruction noted by the prosector. In left lobe two calculi as large as cherry pits, one distinctly facetted and the other well rounded; both yellow in color, with streaks of black pigment. All intrahepatic ducts much dilated. Several stones in the gall-bladder much larger than those in the liver. Liver atrophic. No cholangitis.

Case VII.—Carcinoma of Pancreas, Cholelithiasis, Cholangitis, no Intrahepatic Calculi, Obstructive Jaundice.—Male, 44 years old; no history obtainable. Very marked distention of the common, hepatic, and intrahepatic ducts. Pus in all ducts; no pigment masses, concretions or calculi.

Case VIII.—Carcinoma of Papilla, no Cholelithiasis, Obstructive Jaundice, Cholangitis, Multiple Small Hepatic Abscesses, no Intrahepatic Stones.—Male, 56 years old; eleven months before death had choledochus obstruction and cholangitis; three months later improved so that he could eat and work; no fever and only slight icterus during this period of remission. Five months ago a new attack of choledochus obstruction and cholangitis, which led to his death. Autopsy showed enormous distention of the common, hepatic, and intrahepatic ducts. All filled with pus; no sand or calculi found. At papilla, moderately large obstructing neoplasm.

Case IX.—Papillary Carcinoma of Gall-Bladder, Metastases in Choledochus, Obstructive Jaundice, Cholangitis, no Cholelithiasis, no Intrahepatic Calculi or Gravel.—Male, 74 years old; occasional pains in abdomen, during past four years. Five to six weeks before death had cutting pain in right hypochondrium. This came in attacks. Three to four weeks before death, pain became more severe, and chills began. Progressive emaciation. Never vomited spontaneously. No previous history of gall-stones. Autopsy showed a primary carcinoma of the gall-bladder, without any stones. A metastasis in the choledochus, and a dilatation of the ducts behind the obstruction. In choledochus, etc., and intrahepatic ducts, no calculi or gravel. Multiple abscesses in the peripheral parts of the liver, especially in the left lobe. Pus throughout intrahepatic ducts.

Case X.—Suppurating Echinococcus Cyst of Liver, Obstruction of Extrahepatic Ducts, Catarrhal Cholangitis, Chronic Cholecystitis.—Female, 27 years old; six months before death noted a tumor in right hypochondrium; no tenderness or pain, no colic, no vomiting nor icterus. Tumor was smooth, and seemingly of liver origin. About five months ago, gradual onset of icterus; no nausea or vomiting. Was able to continue work. Four to five weeks before death severe pains in region of tumor; no colic or cramps. Pains did not radiate. Never passed stones. Stools at first acholic, later somewhat colored. Temperature while under observation showed daily afternoon elevations. Autopsy showed a suppurating echinococcus cyst in the neighborhood of the porta hepatis, with considerable cicatricial tissue about its wall. Both processes obstructed the hepatic and common duct, and produced a moderate dilatation of the intrahepatic ducts. Mucosa of these, and of the hepatic duct, very much injected, and covered with tenacious mucopus and bile. No sign of stone formation. No gravel or calculi. Gall-bladder showed thickening of its walls and contracted lumen. Evidently the chronic cholecystitis had not led to gall-stone production.

In all these cases intrahepatic stones were found six times, and only in those cases where extrahepatic cholelithiasis was present. In all the other cases my search was in vain. Of the cholelithiasis cases only those that had or had had an obstruction of the choledochus by stones and secondary cholangitis showed intrahepatic stones. Cases of cholangitis secondary to tumors obstructing the common duct without extrahepatic cholelithiasis showed no intrahepatic stones. Moreover, all the other cases were negative, showing that the occurrence of intrahepatic stones of intrahepatic origin must be attributed to at least three different factors, obstruction, cholangitis, and a third unknown factor, otherwise, the obstruction of the common duct and secondary cholangitis, in the cases of tumor of the papilla and pancreas, etc., would have led to the formation of stones within the liver.

Similar cases in the literature I should not like to make use of, as the cases often lack important details in the various publications, and there is no guarantee that a thorough search for stones was made.

Just the nature of this third factor need not be discussed here. It must, however, be emphasized that choledochus obstruction, by stone, when followed by a cholangitis, leads to intrahepatic stone formation. On the other hand, cases of cholangitis in non-cholelithiatic patients do not develop intrahepatic stones. Whether this will be found true in a more extended experience time must show. Cholangitic material is very scarce, even at such an institute as that of Professor Weichselbaum.

The stone production seems to be just as likely to take place whether the cholangitis is severe or moderate, which is opposed to the present conceptions based on the work of Mignot,[25] Miyake,[26] and others. These experimenters showed that a mild infection of the gall-bladder by different bacteria frequently led to the formation of gall-stones, whereas a severe cholecystitis was fatal before stones formed. In the livers in my cases the ducts were several times full of pus and desquamated epitheliun post-mortem, and once already noted at operation, when the choledochus was incised. Still, stones had developed.

It is well known since Netter and Homen's[27] experiments, that obstruction of the common duct leads to infection of the more central branches of the biliary system. Coli communis, staphylococci, streptococci, etc., wander in, and a more or less extensive cholangitis results. On post-mortem material such as I had, it is impossible to determine which bacteria are at the bottom of the trouble. As von Mieczkowski's[28] work has shown,

the post-mortem bacteriological examinations of the biliary passages lead to great errors. L'Etienne found, in 24 out of 42 normal cases, bacteria in the bladder bile obtained post-mortem, whereas von Mieczkowski, obtaining the bile directly from the aspirated gall-bladder during laparotomies, found it sterile, in the 15 cases examined.

The reports of Kehr[29] and of Riedel[30] are particularly valuable, as they worked with fluids in cholangitic cases obtained during life. In nine cases of choledochus obstruction reported by Kehr *bacterium coli* was present seven times, *streptococcus pyogenes* (*longus*) twice, and *staphylococcus pyogenes aureus* twice, in the bile discharged from the drainage tube. In every case the flowing bile was infected, agreeing thus in the main with animal experimentation, *i.e.*, ligation of the choledochus. Riedel's statement is very much to the same effect. In cases of stone in the choledochus causing obstruction, he found in 30 per cent. of 53 cases that there was infection of the gall-passages. Even this estimate is probably too low, judging from the animal experiments in which obstruction of the choledochus led almost regularly to cholangitis. My cases agree very well with the experimental work in the regularity of the development of cholangitis after choledochus obstruction. As experimental work has shown that the kind of micro-organism does not affect the chances of stone production, and as the same varieties are almost constantly present in cholangitis cases, one can not explain the non-formation of stones in cases (VII, VIII, IX and X) of tumor plus cholangitis, by supposing this series of cases to be due to different bacteria, from the other series, in which stones developed.

Another important factor is the time in which stones develop. Hansemann[31] only a few years ago said that nothing is known about this, but since then stones have been repeatedly produced artificially. Homens (cp. Hansemann) had noticed the formation of stones about sutures in the gall-bladder in one and two-thirds years, and Hansemann says he saw a similar case of stone formation in the duodenal wall about a silk suture in seven months. Since then stones have been produced experimentally in one-third to one year. Naturally, in these cases, stones were present even earlier, though smaller in size. In one of my cases I found a tetrahedral stone in the intrahepatic ducts four to five weeks after the commencement of symptoms of obstruction and cholangitis (Case III). Within two months, making allowances for all discrepancies in the anamnesis, stones can develop, and, in this case, a stone the size of a grape pit was found. Thus the element of time will be a factor in the production of intrahepatic stones, in cases of cholangitis.

In the cases (VII-X) of cholangitis with obstruction due to neoplasm, etc., the absence of stones, or gravel, in the ducts could not, however, be due to this factor, as, according to the history, and the evidence furnished by the liver, the obstruction and cholangitis had existed for weeks.

It is thus evident that stone obstruction of the common duct, plus cholangitis, often leads to intrahepatic stone formation. Many cases, however, can be found in the literature, of just this complex, without mention of intrahepatic stones. Whether following the ducts would have shown stones in these cases, it is impossible to say, but the frequency with which I found them seems to point to that conclusion.

In my positive cases, I had one in which stones were found, but no cholangitis was present (Case VI). Some of the largest stones, the size of cherry pits, were in this case. The history of the patient was incomplete, but at autopsy, an enormous dilatation of the choledochus without icterus was found. Stones were in the gall-bladder, and two stones deep in the left lobe of the liver. No signs of cholangitis existed. The stones were of good size and they had been there some time, as was shown by their size and close relation to the duct in which they were found. The dilatation of the biliary passages pointed to an old obstruction. The stones in the gall-bladder, which bore no resemblance to those in the liver, were a ready explanation of the obstruction, and, I think, knowing how regularly an infection follows impaction of a stone in the common duct, that it is justifiable to conclude that in this case a secondary cholangitis led to the stone formation in the liver ducts. The cholangitis subsided as the stone in the common duct passed into the bowel. The choledochus remained hugely distended, some stones were left in the liver, while probably many similar ones had passed into the bowel. Many of the cases in the literature are probably just like this one. Many stones are found in the liver at autopsy, but no cholangitis is present at this time. The ducts are dilated, showing an old obstruction, and the cause of the whole process has been passed into the bowel. In my case, the stones were altogether different in shape, size, and constitution from those in the gall-bladder, so that no chance of an extrahepatic origin of these calculi can be considered. In Czerny's case of chronic obstruction of the choledochus, lasting some 14 years, a similar condition seems to have been present. In this case, which I cite in brief below, as it is an excellent example of these cases, the ducts in the liver were filled with stones.

Case XIII of Mermann's[32] paper on Czerny's cases. J. O., 42 years old; had passed stones through bowel. For 14 years had been getting more and more icteric. Repeated Carlsbad treatment without any benefit; rather, perhaps, increase in jaundice after these "cures." Operation disclosed nine stones in the gall-bladder. Autopsy showed much distended choledochus which was filled with stones of hazelnut size. The hepatic ducts and their peripheral branches in the liver were much dilated and filled, far into the liver, with calculi, which varied in size with the lumen of the intrahepatic ducts, getting smaller the deeper in the liver they were found. The smallest were no larger than small seeds."

Before describing the stones that I found, and

the results they may lead to, I wish to mention the cases of Courvoisier and of Kehr. In a great many of the reported cases, the authors fail to say whether their patients had suffered from cholangitis, jaundice, extrahepatic cholelithiasis, or not, so that it would be useless to attempt a statistic on such unsatisfactory data. It is, however, noteworthy, that in the cases up to 1890, Courvoisier found cholangitis in 15 out of 52 cases of stones in the hepaticus and its branches.

From the above remarks, based on my cases, and the examination of Kehr's, and other reports, the fact that cholangitis is a most important factor in the production of intrahepatic stones can not be denied. Kehr has published a large number of cases of hepaticus drainage, and in a large percentage during the after-treatment stones and fragments of stones were discharged through the drainage tube. How many of these stones were of intrahepatic formation and origin it is difficult to say. In cases that discharged a large number of stones during the after-treatment, which Kehr could not feel in the ducts at operation, it is likely that an intrahepatic production of stones took place, and that these stones were derived from the intrahepatic ducts; the same applies to those cases in which numerous calculi were discharged for many days after the operation, as one would expect the calculi that had escaped the operator's finger to be discharged early, provided they were extrahepatic.

Now, looking through his cases and carefully considering these points, amongst the 17 cases that showed such a discharge of numerous stones after operation, and for a considerable time, there are at least six, perhaps seven, which seem to me probable cases of intrahepatic cholelithiasis.

To avoid any misunderstanding about these cases, I quote them below, abbreviating as much as possible the original publication, but giving all the essential points in the author's own words:

KEHR'S CASES.

Case XI.[33]—E. W., fifty-one years old. History of long standing cholelithiasis with frequent attacks of colic and jaundice. Six weeks before operation a severe attack—jaundice persisting. Fever for a few days. Another attack two weeks before operation.

Diagnosis—Choledochus obstruction due to stone. Cholangitis.

Operation—Choledochotomy. Hepaticus drainage. May 6, 1901. Gall-bladder very small. Contains no stones. Choledochus markedly dilated and contains two large and about 200 small stones. Hepaticus contains foul smelling, turbid bile, mucosa is gangrenous. In branch of hepaticus a calculus is impacted which can not be loosened.

May 7—300 gm. bile discharged. Still malodorous.

May 9—No bile discharged.

May 11—Icterus more marked. Stool probably contained bile on day before this.

May 14—Irrigation of hepaticus and choledochus. Many stones were washed out.

May 16—20 stones from the hepaticus, two of the size of hazelnuts.

May 17—A stone of the size of a pea washed out, otherwise the hepaticus is free.

May 22—Small sandy material washed out.

May 27—Washed out small fragments.

Sept. 13—Wound closed and patient in good condition, but three months later (*Berger, Langenbeck's Arch.* 69) discharged two more small stones and fragments. Later colic, icterus, chill, which were followed by death within two weeks.

Case XII.[34]—J. Sch., thirty-four years old. History of stomach trouble of several years' duration. Six years before operation colic, icterus, vomiting. Repeated colics since then. Seven weeks before operation very severe colic lasting ten days. Marked icterus. Since that attack, repeated mild colics. Emaciation.

Diagnosis—Stones in gall-bladder. Probably stone in choledochus.

Operation—Ectomy, Choledochotomy, Hepaticus drainage. August 21, 1900. Many stones were found in gall-bladder. Stone in cystic duct which reaches into choledochus. No other stones in choledochus. Bile flowing from hepaticus is turbid.

Sept. 2—Irrigation of hepaticus brought away small stones.

Sept. 3—No further stones. Discharged cured. But (*Beiträge zur Bauchchirurgie,* 1902, p. 98) four weeks later a severe colic and vomiting. Scar gave way and bile discharged. Colics returned every four weeks. After these slight icterus. On June 4, 1901, severe attack.

Diagnosis—Stone in choledochus.

Operation.—Duodenotomy (McBurney). Removal of a pea-sized calculus in papilla.

Epicrisis—Stone in the duodenal papilla overlooked at first operation.

Case XIII.[35]—Female, fifty-four years old. Operated February, 1893. Cholecystostomy. One stone found.

One and three-fourths years later again colic and icterus. Passed a stone which contained a silk thread.

One year later (October, 1895) had cholangitic symptoms. Again cholecystostomy. Bladder contained foul bile, and one stone with silk suture as nucleus. Patient improved, but continued biliary discharge pointed to choledochus obstruction. Operation disclosed stone in common duct, but it broke into pieces before it was removed. Abdomen closed, as nothing else was felt. Fistula remained open one-fourth year. Bile flowing, so that obstruction still persisted in choledochus. Shortly after refusing operation, fistula closed without pain. No stone in stool. About one-half year later, having been well during this period, suddenly fierce colic and icterus. High temperature, liver tender, pulse rapid, etc.

October, 1896, gall-bladder opened. Purulent bile and no stones in it. Choledochotomy showed large stone. Irrigation of ducts (hepaticus and choledochus) brought to light a mass of concretions. Irrigation continued for one-half hour.

In after-treatment a large quantity of similar fragments were discharged through the drainage tube.

Case XIV.[36]—F. Str., forty-eight years old. *History*—Two years before operation colic, icterus, vomiting, chill. Three months before operation another severe colic. This recurred frequently of late, and three weeks before operation a particularly severe attack.

Diagnosis—Cholecystitis. Stone in choledochus. Pericholecystitis.

Operation—Ectomy. Choledochotomy. Hepaticus drainage. June 17, 1900.

Gall-bladder is large. Contains many small stones, and turbid sero-bile. In choledochus and hepaticus about ten stones. Bile in ducts foul and turbid.

June 27—Hepatic duct sounded, two pea-sized stones washed out.

July 1—The sound feels a stone in the hepatic duct.

July 2—This stone removed by washing.

July 3—Seven cm. above the incision the sound feels a concretion in the hepatic duct.

July 4—Two concretions of the size of peas taken out.

July 5—Another stone removed.

July 8—In the depth of the hepatic duct another stone.

July 10—Stony particles flow out of the hepatic duct.

July 12—No more stones discharged.

September 6—Patient leaves hospital cured.

Case XV.[37]—D. B., fifty-seven years old. 15 years before operation, colic and slight icterus. Two years before operation severe colic, fever and chills. Directly before operation, quiescent.

Operation disclosed four fair sized stones in the common duct. In after-treatment 18 stones and many fragments were discharged through the drainage tube, during more than two months.

The following cases, with autopsy notes, as will be seen, corroborate the above interpretation of the preceding cases as well as my observation based on my own cases.

Case XVI.[38]—During operation on patient, who had been sick for three months with symptoms of cholangitis, a stone was found high up in the hepaticus. After removing it, bile flowed freely. Hepaticus drained seven days after operation. Three stones were discharged. On the eighth day, more stones were discharged from hepaticus and still more felt in depths. Patient died of pneumonia, and autopsy showed in the dilated intrahepatic ducts of second and third degrees more than twelve stones, the size of cherry pits.

Case XVII.[39]—Cholelithiasis gave symptoms three years before operation. Six months previous to operation colic, icterus, peritonitic irritation. Then improved, but four months before operation patient became sick again. At operation cholangitis and stone in choledochus. Also stones in gall-bladder. Death ten days after operation. Autopsy showed 20 small stones in left hepaticus and branches. In the branches of the right hepaticus there were 12 small stones as large as cherry pits. Ducts contained mucus and pus.

In these cases definite signs of cholangitis were present, before or during the operation, and here again we see the common cause of intrahepatic stone formation, a secondary cholangitis following an obstruction of the choledochus by stone. In one of these cases (Case XVI), the intrahepatic stones formed within three months, agreeing with my above post-morten results. Whereas in one of my cases the stone was small four to five weeks after the onset of cholangitis and obstruction, in another case of my series, and in one of Kehr's cases, autopsy revealed stones the size of cherry pits three months after the commencement of the trouble.

(To be continued.)

THE VALUE OF A KNOWLEDGE OF ABNORMAL MOBILITY OF THE IRIS AS AN AID IN DIAGNOSING DISEASES OF THE NERVOUS SYSTEM.[1][2]

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SWANZY, a distinguished oculist and brilliant writer, says that the condition of the pupils, whether dilated, contracted or normal, is of very slight significance or value in the diagnosis either of the kind or the position of any intra-cranial lesion. And he goes on to say that slight in value as is the state of the pupils in cerebral cases, there is probably no symptom which receives more attention from the clinician in his note-taking. It has seemed to me that the oculist and the general practitioner alike could only draw the most misleading inferences from such an avowal. In consequence, I have taken great pains and labor to review a very extensive field of literature both in ophthalmology, and in nervous and mental diseases, in order to confirm or modify my very different conception of the value of a knowledge of abnormal pupillary actions.

In order to appreciate the significance of abnormal mobility of the iris in diseases of the nervous system, it is essential that we should thoroughly understand the anatomical basis for normal pupillary activity, and the appearance of the normal pupil. We should also have a knowledge of the variations of the pupil that are independent of diseases of the brain and spinal cord.

According to Woinow the diameter of the pupil varies, even when the accommodation is at rest, from 2.44 to 5.82 mm., the average diameter being about 4.14 mm. The size of the normal pupil, although determined mostly by the amount of illumination to which it is exposed, varies widely as to its condition of contraction and dilatation, according to the resultant of the many stimuli which react upon it directly or indirectly. In recording the size of the pupil or variations in

1 Read before the Medical Society of the District of Columbia April 6, 1904.

2 Received for publication April 19, 1904.

its diameter, pupillometers should be employed. Randall's modification of Follin's instrument is one of the best practical pupillometers and consists of a scale of circles. It is held close to the eye under observation and rotated until that circle is found which most nearly matches the pupil in size, and the diameter in millimeters then noted. This method of exactly ascertaining the diameter of the pupil under observation is much more useful than such loose statements as "medium-sized pupil" or "pupils dilated," etc.

The size of the pupil is larger in dark eyes than in blue ones; in myopia it is greater than in emmetropia and is more sluggish in response to the various stimuli. There is an associated condition of atrophy of the ciliary muscle. In hypermetropia the pupil is smaller than in emmetropia and acts more eneregtically to stimulation, and there is an accompanying hypertrophy of the muscle of accommodation. Between the twentieth and fortieth years the variations in the size of the normal pupil in the different types of refraction become less pronounced, while after the fortieth year the differences are scarcely appreciable. With advancing years the pupil normally becomes small in size. The small pupil of elderly people is due not only to sclerosis of the walls of the vessels and rigidity of the stroma of the iris, but also to a diminution of the activity of the sympathetic nerve. In the vast majority of cases in normal eyes the pupils are equal not only when both eyes are exposed to light or shaded, but also when one is shaded.

Where there is inequality of the pupils (anisocoria) the more sluggish or immobile pupil is the pathological one. Unequal pupils occur where one eye is blind, or where the character of the refraction in the two eyes is very different, in traumatism, dental caries, in paretic dementia, locomotor ataxia, insular sclerosis, migraine, and in focal disease of the brain.

Bilateral dilatation of the pupils may occur in cases where there is a deficient blood-supply to the brain centers or where there is diminution of blood in the vessels of the iris, as in anemia, syncope, nausea, shock, aortic regurgitation, trance, melancholia, the coma following an epileptic convulsion, and in depressed nervous tone. It occurs in fevers with active delirium; also in typhoid fever. There is a slight dilatation of the pupils at every ordinary inspiration depending on variations of the blood pressure.

Bilateral contraction of the pupil occurs in conditions producing congestion of the iris, as in plethora, typhus fever, mitral insufficiency and other diseases leading to venous congestion, and in pulmonary congestion. At every pulse beat there is a tendency to myosis through systolic filling of the arteries; bilateral contraction also occurs in diminished intra-ocular pressure (*e.g.*, paracentesis corneæ). During forced expiration two factors are at play in affecting the pupil: if the greater factor is the retention of carbon dioxide the pupil will be dilated by stimulation of the pupil-dilating center; if congestion of the head, and therefore of the iris, predominates, there will be contraction of the pupil.

The anatomy at the bottom of a simple involuntary response of the pupil to the direct and indirect light stimulus is as follows: first occur the rods and cones of the neuro-epithelium of the retina, then the bipolar cells, and then the neurons whose cell-bodies constitute the ganglionic layer of the retina. These cell-bodies send out axons which collectively constitute the bulk of the optic nerve; thence in sequence they form the optic chiasma and take part in the formation of both optic tracts. From each tract the pupillary fibers, as distinguished from the visual fibers, proceed through the superior brachium to the superior quadrigeminal body or colliculus of the corresponding side and terminate in arborizations around other cell-bodies located in these structures. The pathway extending from the retina to the superior colliculus on either side constitutes the afferent or centripetal one.

The cell-bodies located in either colliculus send out axons which descend and arborize around the cell-bodies of the oculomotor nucleus in the floor of the Sylvian aqueduct on the corresponding side of the median line. These neurons, extending between the superior colliculus of one side and the oculomotor nucleus of the same side, constitute the association pathway, or Meynert's fibers.

The oculomotor nucleus is highly specialized and differentiated into several nests of cells or subnuclei, such as those for accommodation, for pupil contraction, and for convergence. The axons of the cell-bodies situated in these subnuclei pass along the third nerve and constitute the efferent or centrifugal portion of the reflex arc.

It is through the pupillary fibers of the optic nerve on each side decussating partially and going through both optic tracts that each retina is brought into relation with both oculomotor nuclei, so that the light impinging on one retina can stimulate both pupil-contracting centers and cause both pupils to contract. If the light stimulus is applied to one retina, say the right one, and the right pupil contracts, we obtain the *direct* light reflex, the left pupil contracting under the same circumstances constitutes normally the *indirect* or consensual light reflex.

Another important mechanism by which the consensual light reflex is possible is due to the connection of the two pupil-contracting centers by commissural fibers.

Those efferent fibers destined to control the convergence of the visual axes in binocular vision go directly to the internal rectus muscles. Those that are to control the contraction of the pupil through the sphincter iridis and the accommodation of the eyes for points at varying distances through the ciliary muscles, pass to the ciliary ganglion and arborize around the cell-bodies there located. The axons of these cell bodies thence pass by way of the short ciliary nerves to the sphincter iridis and ciliary muscles.

The centrifugal pathway for reflex dilatation

of the pupil starts at the pupil-dilating center in the fore part of the floor of the Sylvian passage and is probably situated a little external to the oculomotor center. The cell bodies of this center send out axons that pass downward toward the ciliospinal center situated in the lower cervical and upper dorsal part of the spinal cord.

It is probable that a series of related neurons intervene between the pupil-dilating center in the crus cerebri and the pupil-dilating center in the cord, called the ciliospinal center, the last of the series arborizing around the cell-bodies in the ciliospinal center. From this latter center the cell-bodies send out axons that traverse the anterior roots of the first and second thoracic nerves, and their rami communicates, thus reaching the first thoracic ganglion and traveling thence along the cervical sympathetic to the superior cervical ganglion, where they arborize around the cell-bodies contained therein. These cell-bodies send out axons that traverse the cavernous plexus and the ganglion of Gasser (without arborizing in the latter) to reach the ophthalmic division of the fifth nerve and its nasal branch; thence they proceed by way of the long ciliary nerves to the dilator pupillæ. This complicated but well-defined route constitutes the centrifugal pathway for pupil-dilating stimuli.

One of the many centripetal pathways concerned in producing reflex dilatation of the pupil can be illustrated by studying the skin-reflex. If the skin of the neck be pinched, or better, stimulated with a faradic brush, the sensory impulse travels from the nerves of the skin through the posterior roots of the cervical spinal nerves directly, and indirectly by relays of neurons, to the ciliospinal center. The axons of this centripetal pathway that reach the ciliospinal center arborize around the cell-bodies contained therein and start impulses that traverse the centrifugal path, already described, to the dilator pupillæ muscle. Another centripetal pathway is from the cerebral cortex through the corona radiata, internal capsule and crus cerebri to the pupil-dilating center in the floor of the Sylvian passage and thence to the ciliospinal center. This latter is the route taken by the psychic impulses that dilate the pupil, as fear, anger, etc.

The centripetal pathways for dilatation of the pupil are as innumerable as are the pathways for all sensations except those of illumination. In health the reflex contraction of the pupil is invariably accomplished by the light stimulus or the convergence stimulus reacting upon the pupil-contracting center. Every other sensory and psychic stimulus reacts to a greater or less degree upon the pupil-dilating center, tending to stimulate the dilator pupillæ muscle.

The normal medium dilatation of the pupil is dependent mainly upon the presence of stimuli of medium intensity. In a person who is asleep or under complete anesthesia, and in whom therefore the psychic and all other stimuli are at their lowest intensity, the pupils are contracted.

Women, since they are of a more sensitive organization, have larger pupils than men. Nervous, sensitive people, have larger pupils than dull, phlegmatic persons of the same sex.

The reflex contracting and dilating movements of the pupil are altogether involuntary. If both the contracting and dilating mechanisms are stimulated simultaneously the pupil contracts.

But there are movements of the pupil which, though not immediately caused by efferent or afferent stimuli, are indirectly produced through correlation with the voluntary conjugate movements of the eyes from parallelism to convergence, or the reverse, in binocular vision. The centrifugal pathway for voluntary convergence of the visual axes in the horizontal plans starts from the cortical center for convergence, which corresponds with the macular center for convergence, in the middle of the calcarine fissure of the occipital lobe. The cell-bodies located in this region send out axons that traverse the optic radiations to reach the retrolenticular part of the internal capsule and thence proceed through the crus cerebri to the nucleus of the oculomotor nerve, arborizing around the cell-bodies of the convergence nucleus contained therein. There is such an intimate relation, through association fibers, between the single, medianly situated, convergence nucleus in the floor of the Sylvian passage and the accommodation and pupil-contracting centers on each side, that a stimulation of the convergence center effects simultaneously a stimulation of the ciliary and sphincter iridis muscles on both sides. Hence convergence of the visual axes normally causes a contraction of both pupils and constitutes what is known as the convergence stimulus of the pupils; a return of the visual axes to parallelism producing dilatation of the pupil.

While there is only one centrifugal pathway along which an impulse travels from the cortical center for convergence to the corresponding center in the mesencephalon, there are many pathways for afferent or centripetal impulses to reach the cortical center for convergence. If we take into consideration all the sense perceptions, all the associations of ideas, all the activities of memory, imagination, and the emotions, the resultant of which psychic processes constitutes the basis for volition, we may say that the afferent or centripetal pathways for influencing the voluntary movements of convergence and the correlated movements of contraction of the pupil are innumerable and vary immensely in their directness or indirectness and therefore in their complexity. But the principles underlying all these activities are few in number and easily comprehended. For instance, the light stimulus, falling on an excentric portion of the retina (a portion other than the macula lutea) passes along the optic nerve, chiasma, and optic tracts to the lateral geniculate bodies. Here the axons of the visual cell-bodies located in the ganglionic layer of the retina arborize around other cell-bodies located in these lateral geniculate bodies. Axons go out from these cell-bodies along the optic radiation and arborize around cell-bodies located in the corresponding

eccentric portion of the cuneus. Then associating neurons constitute the last relay of neurons in the afferent pathway by which the light stimulus is transmitted to the cortical (macular) convergence center, and cause the eyes to converge to the luminous point, through volition (and also frequently involuntarily). Of course involuntary reflex convergence, and the accompanying myosis, can be induced by stimulation of the convergence center by other afferent pathways.

Another complex afferent pathway is that by which a sound causes voluntary or involuntary movements of the head (and body at times) and convergence of the eyes toward the source or direction of the sound.

In *disease* the dilatation or the contraction of the pupil can be either irritative or paralytic, or both. *Paralytic mydriasis* is produced by an inhibiting disease, either of the pupil-contracting center, or of the fibers that pass along the third nerve to the sphincter iridis; it may also be due to disease of the centripetal pathway between the retina and the oculomotor nucleus. The pupil is moderately dilated, reacting only slightly to myotics, but dilating greatly under mydriatics. If the lesion be located between the pupil-contracting center and the sphincter iridis there can be neither direct nor consensual light reflex. Should the disease lie in the centripetal path between the retina and the pupil-contracting center the pupil can react to convergence and to the consensual light reflex, but not to the direct light stimulus. *Spastic mydriasis* is caused by an irritation of either the pupil-dilating center or the pupil-dilating fibers going to the dilator pupillæ muscle. In this form of mydriasis there is moderate dilatation of the pupil, and it does not dilate further in response to sensory stimuli. Myotics affect the pupil but slightly, while mydriatics dilate it to the maximum. The pupil contracts only moderately to the convergence and light stimuli.

While either form of mydriasis occurring separately evokes only moderate dilatation, the two occurring in conjunction would develop a maximum dilatation. *Paralytic myosis* is due to an inhibiting lesion of the pupil-dilating center in the mesencephalon or spinal cord or of the pupil-dilating fibers.

In this myosis the contraction is slight and the pupil is little affected by mydriatics, while myotics have a maximum effect. *Spastic myosis* is caused by an irritation of the pupil-contracting center or of the pupil-contracting fibers. The pupil is moderately contracted and reacts very slightly to reflex stimuli; but it is very responsive to myotics and mydriatics, these drugs effecting contraction and dilatation *ad maximum*. While in either paralytic or spastic myosis occurring separately the contraction is moderate, the two in conjunction would develop a contraction *ad maximum*.

A disease of the pupil-dilating center or its centrifugal fibers will induce either spastic mydriasis or paralytic myosis according to whether the lesion is in its early and stimulating stage, or whether it has advanced to its late and inhibiting phase. For instance, the early stages of diseases of the spinal cord in the cervical region will develop spastic mydriasis, as spinal hyperemia, meningitis, myelitis, and neoplasms: this spastic mydriasis is also caused by the pressure of enlarged lymphatic glands on the cervical portion of the sympathetic nerve, also by an aneurism of the arch of the aorta, or of the brachio-cephalic or common-carotid arteries. The later inhibiting stages of all these lesions would induce paralytic myosis. Traumatism of the cervical portion of the cord or sympathetic nerve would cause paralytic myosis. The toxin of locomotor ataxia frequently develops an early spastic mydriasis and a later paralytic (so-called spinal) myosis. This type of myosis is also an important symptom in the paralytic pseudo-dementia of syphilitic origin, and in paralytic dementia. It occurs also in insular sclerosis, in some forms of multiple neuritis, and in bulbar palsy when complicated with progressive muscular atrophy. The amblyopia of chronic alcoholism is frequently accompanied by paralytic myosis due to fatty degeneration in the medulla oblongata.

The value of a knowledge of pupillary abnormalities is well shown in the case of paralytic myosis. The small pupil in this condition is usually associated with retraction of the ball of the eye into the orbit and narrowing of the palpebral fissure and is most frequently observed in aneurism of the thoracic aorta or other mediastinal tumor; in chronic inflammations of the cervical portion of the cord; and in locomotor ataxia. In these cases a general inspection of the body will often enable the physician to make a diagnosis instantly. If the lesion be an aneurism some pulsation of the upper part of the chest would be observed; in diseases of the cervical cord, muscular atrophy of the upper limbs would be noticed and the position of the hands and the spastic attitude of the feet would be conspicuous; while in locomotor ataxia all the signs mentioned above would be lacking and both pupils would be small and inactive to light.

Spastic mydriasis also occurs in irritation of the sensory nerves of the intestines by worms or intestinal tumors: in the spinal irritation of people suffering with anemia after severe illness; in acute mania and melancholia; in paralytic dementia when it is often associated with paralytic myosis in the other eye, and in hunger. While mydriasis in spinal diseases indicates an irritative process, in cerebral lesions it points to an extensive inhibiting disease of the brain. Diseases of the pupil-contracting center, or its efferent fibers in the third cranial nerve, will cause either spastic myosis or paralytic mydriasis, according to the irritating or depressing nature of the lesion. Spastic or irritative myosis is symptomatic of early stages of inflammatory diseases of the brain and its meninges; it is present in the early stages of epileptic and hysterical attacks; in the early stages of intracranial tumors involving the third nerve. If, during the course of tuberculous, simple or cerebro-

spinal meningitis, or other inflammatory affections of the brain, mydriasis replaces the medium myosis the prognosis becomes graver. It points to paralysis of the third nerve and indicates the stage of depression. Spastic myosis occurs in engravers and watchmakers in consequence of the protracted stimulation of the convergence and accommodation centers; also in those having tobacco amblyopia due to the excessive stimulation of the myotic center by the nicotine.

In apoplexy due to hemorrhage there is at first spastic myosis (or the pupils may be unequal) and the light reflex is lost, whereas in thrombosis and embolism the pupils are not myotic and they react to light and are equal. When spastic myosis occurs in abscess of the brain the myosis is at first on the same side as the lesion. Spastic myosis occurs when the cerebellum is invaded by small hemorrhages; also as a reflex action in many diseases of the eye involving irritation of the trifacial nerve; and in pressure on the pons. The lesion of the pons in which bilateral myosis is most frequently observed is hemorrhage into this structure. When a patient is in profound coma and has great contraction of the pupils,—opium poisoning being excluded,—a hemorrhage into the pons varolii should always be suspected. Occasionally the double myosis is noted in meningeal hemorrhages that occur through the corpus stratium into the lateral ventricle. Frequently, in pontine apoplexy, the pupils, instead of being contracted, are normal. The collateral or accompanying symptoms are required to locate and define the nature of the lesion.

Paralytic mydriasis is caused by diseases of the orbit and intra-ocular growths that produce pressure upon the ciliary nerves; in glaucoma for the same reason (although cloudiness of the media and diminution of illumination also encourages the mydriasis); in lesions of the brain causing increased intracranial pressure, such as hemorrhage, tumors, and large abscesses; in hemorrhage into the crus cerebri or the centrum ovale; in cerebral softening; and in acute dementia with edema of the cortex. In the late stages of paralytic dementia irritative myosis gives place to paralytic mydriasis. When first one eye and then the other is affected by transient mydriasis the symptom is to be regarded as a prodrome of insanity. Optic atrophy, by preventing the conduction of the light stimulus, induces paralytic mydriasis, but does not prevent reflex contraction of the pupil in response to the convergence stimulus.

Another anomaly of the pupil is hippus. *Hippus* may be defined as a normal clonic rhythmical spasm of the sphincter iridis. With a given fixation and illumination there is a rhythmical dilation and contraction of the pupil. Even when the pupil seems perfectly quiet its inspection with the corneal microscope will reveal that there are minute and irregular variations in its size that are perpetually taking place in response to the ever-changing psychic and sensory impulses that are playing upon the pupil-dilating center. This minute hippus has been aptly designated the "unrest of the pupil." Hippus, when pathological, is usually associated with nystagmus. The latter symptom is a clonic rhythmical spasm of the muscles concerned in producing conjugate lateral and other movements of the eyes. Both abnormal hippus and nystagmus are very important symptoms in the diagnosis of insular sclerosis. Abnormal or exaggerated hippus occurs in mania and other psychical disturbances; in hysteria, epilepsy and meningitis; it is not only comparatively frequent in insular sclerosis but it also, in two recorded cases, was the only brain symptom noted.

As nuclear palsy of the convergence center in the floor of the Sylvian passage is relatively frequent in this sclerosis the pupillary symptoms pertaining to that palsy are often noted. In neurasthenia and in cases of secondary spasms and tremor following attacks of apoplexy, there is a very noticeable increase in the oscillations of the puplis. Through irritation of the first thoracic ganglion by tuberculous glands a transient, rapid, and unsymmetrical dilation of the pupils may be observed in a considerable number of cases of tuberculosis. Buzzard taught that of all the organic diseases of the nervous system, insular sclerosis in its early stages is most commonly mistaken for hysteria. Since a series of rapid contractions and dilations of the pupil on sudden exposure to light occurs in both of these diseases, the associated symptoms of the hippus are necessary to differentiate the diseases, particularly the associated eye-symptom known as nystagmus that occurs in the sclerosis.

When a pupil reacts slowly to light it indicates that chronic degenerative changes are taking place in the nervous system. *Basal lesions* of the third nerve are common factors in producing pupillary disturbances,—usually paralytic mydriasis. The most common cause is the gummatous exudate of syphilis. In basal lesions there is very generally an involvement of several nerves without reference to symmetry, and this fact constitutes the chief diagnostic feature of these lesions. A crossed paralysis of the third nerve due to basal lesions cannot always be distinguished from that induced by pontine disease. Usually in the former the symptoms appear gradually and in sequence; in the latter simultaneously and suddenly.

Swanzy believes that an indolent and chronic form of meningitis due to rheumatism, even when no other signs of rheumatism are present, is often a cause of basal paralysis of the third nerve. There may be immobility of the pupil, coming and going from day to day. In the investigation of basal lesions it is well to remember that tumors of the frontal lobe of the cerebrum tend to grow toward the base of the brain and there directly involve the cranial nerves. Also basal paralysis occurs as a distant or pressure symptom of tumors of the cerebellum and cerebral hemispheres.

A neoplasm occupying the cavernous sinus, a rupture of the cavernous artery in the cavernous sinus, an aneurism of the cavernous artery or of the intracranial portion of the ophthalmic artery,

and thrombosis of the cavernous sinus, may all involve the third nerve, either by direct pressure or indirectly by pressure of the distended ophthalmic vein. Hence, in these affections pupillary symptoms may be prominent. According to the amount of irritation or depression of the third nerve, there would be irritative myosis or paralytic mydriasis.

Fascicular or crossed paralysis of the third nerve is another important condition causing abnormal pupillary phenomena. Since the superior peduncle of the cerebellum, like the third nerve, is intimately related to the red nucleus in the tegmentum, vertigo is a common symptom in fascicular paralysis of the third nerve.

Nuclear disease of the oculomotor nerve is a common cause of symmetrical mydriasis and may be developed by many causes. It may complicate bulbar paralysis, progressive muscular atrophy, paralytic dementia, insular sclerosis, locomotor ataxia, multiple neuritis, exophthalmic goiter, and occurs as a sequel of diphtheria, grip, diabetes, and purpura; it follows injuries to the head unaccompanied, as well as accompanied, by fracture. The most common causes of primary cases of this disease are alcoholism and syphilis. Other causes are poisoning by carbonic oxide, nicotine, ptomains, sulphuric acid, lead, and exposure to cold, also congenital predisposition, where it occurs in young children. According to Swanzy, chronic alcoholism is the factor in developing what he calls sudden or peracute nuclear ocular palsy. Paralysis of the power of convergence due to nuclear disease of the convergence center in the floor of the Sylvian aqueduct gives well-defined pupillary symptoms. In this affection the power to fix both visual axes upon the same point is lost, while the eyes separately or together can move to either side. In other words the nucleus of the sixth nerve on either side can be stimulated and evoke conjugate lateral motions and each internal rectus can respond to a stimulus from its own special nucleus. In this focal disease of the brain the light reflex is intact, and the pupil is not dilated, but the reflex contraction of the pupil does not occur on attempting to converge the eyes,—the convergence stimulus is abolished. A greater or less impairment of accommodation is a concomitant of these conditions. This nuclear paralysis must be carefully distinguished from the impairment of convergence that is common in exophthalmic goiter and which is due to mechanical causes; and also from insufficiency of the internal recti that may be associated with myopia. Berry records a case of spasm of convergence due to hysteria. Although he does not mention it, I presume the condition was accompanied by irritative myosis.

Thrombosis of one cavernous sinus may spread through the circular sinus to the opposite cavernous sinus, causing total immobility first of one eyeball and then the other. This condition would be differentiated from nuclear ophthalmoplegia by the presence of edema of the lids and chemosis, optic neuritis, exophthalmos, pain, and finally loss of sensation. In addition to these local symptom, there would be chills, fever, etc. The symptoms diagnostic of nuclear palsy of the ocular muscles are their bilateral and often symmetrical occurrence, and also the fact that commonly either the intrinsic or the extrinsic muscles alone are paralyzed, also the frequent immunity of the levator palpebræ.

Tumors of the pineal gland and other tumors in the region of the quadrigeminal bodies by compressing the nuclei in the floor of the aqueduct of Sylvius furnish an important localizing distant symptom because impairment of the muscles of the eye very similar to those of nuclear ocular palsy (ophthalmoplegia) will be present. This ocular palsy is commonly associated with cerebral ataxia. A tumor of the median region of the cerebellum, as the vermis, has engendered the same group of symptoms. Pupillary disturbance is a frequent concomitant of the other eye symptoms.

Wernicke's Pupil Symptom.—A lesion of the visual path between the optic chiasma and the cortical center for vision will cause the symptom known as homonymous hemianopsia. The presence of Wernicke's pupil-symptom is diagnostic in enabling us to locate the lesion in the optic tract. This symptom is difficult to evoke. The attempt to produce it should be made in a dark room with the aid of an assistant. The source of illumination can be a gas jet of moderate brightness and should be situated behind the patient, and the latter directed to look into the distance. The pupil should then be moderately illuminated by the assistant reflecting light into it with a plane ophthalmoscopic mirror while the examiner directs from the concave mirror of his ophthalmoscope a narrow beam of light upon different portions of the retina. If the light is reflected upon the hemiopic portion of the retina to the exclusion of the remaining portion, either there will be no light-reflex of the pupil or, which is more usual, the pupillary response will be much more sluggish than when the light is reflected upon the normal half of the retina. The lack of promptness of the pupillary reaction, rather than its entire absence, in the test for hemiopia, is due to the fact that it is impossible to prevent some of the light from reaching the normal side of the retina. The pupillary movements may be quite delicate in this test, and therefore the pupil should be very carefully observed.

A simpler and much more accurate test, and one that can be applied without the aid of an assistant is to use the instrument devised by Von Fragstein and Kempner instead of the concave mirror for sending a very small beam of light upon various parts of the retina.

Great care should be exercised in throwing the beam of light into the eye so as to be sure that its angle of incidence as well as its intensity shall be as nearly as possible the same on each side of the retina. This is important because a variation in the angle of incidence of the beam of light sent through the pupil of a perfectly normal eye on

one side and then on the other will cause a decided difference in the rapidity and promptness of the pupil reflex. It should be borne in mind that occasionally in the same patient Wernicke's pupil-symptom may be present at one observation and then on a subsequent day be absent. This is to be explained by the presumption that the pupillary nerves in the optic tract are damaged but not destroyed, so that they may be more responsive to stimuli on some days than on others. Again in lesions of the optic tract hemianopsia may be present while Wernicke's pupil-symptom is altogether absent, owing probably to the greater vulnerability of the visual nerves than the pupillary ones.

Wernicke reports a case of brachial monoplegia, associated with homonymous hemianopsia which resulted from a stab in the head. The detection of his pupil-symptom (the hemianopic pupillary inactivity) led him to make the correct diagnosis of injury of the optic tract and of the closely related crus cerebri. Henschen reported observations on a patient who presented fleeting conditions of hemianopsia and Wernicke's pupil-symptom. The lesion was a tumor of the dura mater pressing against the brain in the region of the fissure of Sylvius, and evoking the symptoms by disturbance of the blood-circulation.

A case published by Leydon shows that tumors of the lenticular nucleus, the optic thalamus, crus cerebri, and the temporal lobe of the cerebrum may encroach upon the optic tract and cause homonymous hemianopsia and the hemiopic pupil. In this case of Leyden's there were left hemianopsia and Wernicke's pupil-symptom, associated with left hemiplegia, left ptosis and facial paralysis, and finally, conjugate deviation of the eyes to the right. The last symptom indicated a lesion in the right cerebral hemisphere, while all of the other symptoms, collectively, suggested a lesion of the right crus cerebri and optic tract. At the autopsy a tumor was found that involved the crus cerebri, optic tract and lenticular nucleus on the right side of the brain.

Syphilitic meningitis and gummata, and tubercles are the most frequent lesions of the optic tract. Hemorrhages and softening are uncommon.

There are no pupillary symptoms that enable us to differentiate between the hemianopsia due to lesion of the optic radiations and that due to disease of the cortical visual centers. While the association of Wernicke's symptom with homonymous hemianopsia would indicate a lesion of the optic tract, its conjunction with bitemporal hemianopsia would indicate a disease of the middle segment of the chiasma involving the decussating fibers. If the hemianopsia were unilateral, and not dependent on disease of the retina, it would suggest an injury to one optic nerve. The hemianopic pupil is a rare symptom in infantile paralysis. In hydrocephalus, owing to the pressure by the floor of the distended third ventricle on the optic chiasma, there is great liability to bitemporal hemianopsia and the hemiopic pupil. It is because of the great difficulty in eliciting Wernicke's symptom that it was so long overlooked. It was not observed until several years after it was announced by Wernicke as one that should, on theoretical grounds, be capable of detection.

Pupillary symptoms in *epilepsy* are quite important at certain times. During an epileptic seizure the pupils are quite variable. Usually at the commencement of the attack there is spasmodic myosis, or the pupils are normal but they undergo paralytic mydriasis during the phase of tonic spasm and so continue until the return of consciousness. The convulsions of meningo-encephalitis are associated on the other hand with a contracted pupil. The fact that the light-reflex is retained during a hysterical convulsion but is lost during an epileptic spasm is of value in differentiating one form of convulsion from the other. Another important aid in distinguishing a true epileptic convulsion from that of hysteria or of a malingerer is the presence in the former of hippus or rapid alterations of the pupillary diameter.

In *locomotor ataxia* the pupil may be normal or even dilated, but commonly it is contracted. Frequently the contraction is so extreme as to constitute the condition known as "pin-hole" pupil,—a state due, not to irritative myosis, but to a secondary contracture of the sphincter iridis due to paralysis of the dilator pupillæ. The abnormal condition of the iris may be due to a lesion, either of the brain or the spinal cord. In the former case the seat of the disease is in the pupil-dilating center of the floor of the aqueduct of Sylvius. In the latter case the lesion is located in the upper dorsal and the lower cervical portion of the cord. In either instance the myosis of pupil is of the paralytic type. In those cases, usually early, of locomotor ataxia in which Meynert's fibers are not involved, there is only a medium myosis and the pupil reacts to the light reflex as well as to convergence; but later in the disease when the fibers of Mynert are involved, the pupil, while responding to the convergence stimulus, does not do so to light or, at least, only very slightly. This constitutes the very valuable clinical symptom known as the Argyll-Robertson pupil. If Meynert's fibers are uninvolved the pupil reacts to light as well as to convergence, even when it exhibits the extreme myosis known as the "pin-hole" pupil. In testing for the presence of the Argyll-Robertson pupil care must be exercised not to confuse unilateral reflex blindness with unilateral reflex iridoplegia, for in both cases there is absence of direct light reflex on the diseased side, but response to the convergence stimulus. In the former case there is a lesion in the centripetal pupil-contracting fibers either in the retina, optic nerve, optic tract, or superior brachium. In the unilateral iridoplegia the lesion is in the sphincter iridis subnucleus of the oculomotor nucleus.

The Argyll-Robertson pupil occurs not only in locomotor ataxia, but also in paralytic dementia, atrophy or softening of the brain, insular sclerosis, in tumors of the basal ganglia adjacent to the third ventricle, in hydrocephalus, syphilis of the

brain, and as a congenital defect. If there should be a response of the pupil to the direct light stimulus, but not to the convergence stimulus, we would have the reverse of the Argyll-Robertson pupil, indicating a lesion of a particular part of the oculomotor nucleus. In a considerable number of the cases an eliptical pupil has been noted with the long axis in the vertical meridian. Both in the late and the early stages, in many cases, the pupils present inequalities of size.

The commonly accepted theory of the Argyll-Robertson pupil is as follows: it is a lesion of Meynert's fibers, that is, of the fibers extending from the superior quadrigeminal bodies to the nuclei of the third nerves in the floor of the Sylvian aqueduct. This explanation is sufficient in the vast majority of cases of locomotor ataxia because the Argyll-Robertson symptom is most frequently binocular. But in those cases where the symptom is monocular the current explanation is inadequate. It can be readily understood that if only the fibers of Meynert on one side be diseased, the others being normal, that the direct light-reflex may be elicited on the normal side and the indirect or consensual light-reflex may be developed through the internuclear fibers that connect the nucleus of the sphincter iridis of one side with that of the other. In consequence of these facts Bevan Lewis, Heddæus and Jessop teach that the Argyll-Robertson pupil is a nuclear disease, that is a disease of the nucleus of the sphincter iridis nerve. Heddæus believed that there is no direct communcation between the nucleus of the sphincter iridis nerve and that of the ciliary muscle nerve, and that the branch of the third nerve going to the ciliary muscle and the sphincter iridis, contains two independent roots, one from the nucleus of accommodation and the other from the nucleus of the sphincter iridis muscle, so that the disease causing loss of the direct light-reflex could be fascicular as well as nuclear, for destruction of the nerve-root springing from the sphincter iridis nucleus would give loss to the pupil reflex from direct light as well as destruction of the sphincter iridis nucleus itself. Yet Swanzy points out that this theory is not tenable because myosis is a very frequent accompaniment of the Argyll-Robertson symptom. If the view of Heddæus were true the sphincter iridis would always be paralyzed in these cases and the unopposed dilator pupillæ, under the tonic influence of the sympathetic, would always dilate the pupil, thus giving mydriasis as the uniform symptom accompanying the Argyll-Robertson pupil, whereas myosis is the common symptom. In view of all the facts of the case Swanzy makes the observation, which is fully justified in my opinion, that there is much to be learned before an entirely satisfactory explanation of the occurrence of this valuable clinical symptom can be given. Peripheral neuritis is liable to be occasionally mistaken for locomotor ataxia, but the presence of the Argyll-Robertson pupil would readily exclude the former.

Pupillary Symptoms in Insanity.—Anomalies of the pupil are very frequent in the prodromal stages of mental diseases and are therefore of great clinical value. They may, in various cases, consist of irregularity of the shape of the pupils, inequality of the size, loss of the indirect or consensual reflex and of the direct light reflex, the presence of the Argyll-Robertson pupil, of mydriasis or myosis, the absence of the skin reflex, and the paradoxical pupil symptom. In acute curable dementia, or what Berkeley calls "states of mental stupor" the pupils are commonly dilated and react only slowly to convergence, to light, and to skin stimuli. In syphilitic insanity mydriasis and irregularities of the pupils are more usual than contraction. The various psychoses of old age manifest irregularities of the pupils, and present pupils that react slowly to convergence, skin or light reflexes. That organic lesions are present in both acute and chronic alcoholic insanities is evidenced not alone by the presence of tremor and occasional paresis of the facial nerve, but also by unequal or myotic pupils. While pupillary inequalities are quite common in the alcoholic insanities, the tardy reaction of the pupil to convergence and light is much less common than in paralytic dementia. In paranoia abnormalities of iris movement are infrequent, having been observed in about only one per cent. of the cases. And in this connection it is interesting to note that a number of cases of chronic progressive paranoia ultimately develop into paralytic dementia.

Pupillary Symptoms in Paralytic Dementia.—The most common condition of the pupil in this grave disease is marked contraction of the sphincter iridis due to paralysis of the dilator pupillæ through disease of the sympathetic nerve. In this condition the pupils are extremely small and do not expand when the eye is shaded, and they are uninfluenced by exposure to light. Sometimes, in the early stages, when so-called iridoplegia is commencing, the pupil is responsive to a beam of light concentrated upon it by focal illumination; but even then the mobility of the iris is quite limited in extent and presents the hippus or oscillatory movement with a tendency even to wide dilatation.

This dilatation under focal illumination constitutes the paradoxical pupil symptom. This paralytic myosis has sometimes been present for ten years before the complete development of the disease. Paralytic myosis, and therefore, reflex immobility of one pupil alone, is seldom permanently noted since the other soon becomes involved. In eliciting the symptom of reflex immobility, the convergence and therefore the accommodation reaction should be carefully eliminated. The examiner must also take the precaution to ascertain that the patient's eye is not immobile in consequence of the rigidity of sclerosis, or of atrophy of the iris, posterior synechiæ due to a mild or transient iritis, or a myotic drug, etc.

The pupillary symptom next in importance to paralytic myosis is the absence of the indirect or consensual light reaction. The consensual reflex is elicited as follows: both eyes are shaded with-

out touching the skin around either orbit, so as to avoid the liability of introducing the complicating sympathetic or skin-reflex of the pupil. Then one eye, say the left one, is suddenly uncovered when the right pupil will undergo a contraction with following wavy dilatation. Berkeley states that he has observed this consensual wavy dilatation of the pupil before the loss of the light reflex, and its appearance in conjunction with mental phenomena has always led him to make a provisional diagnosis of paralytic dementia.

Another pupillary symptom of much importance in general paresis is the absence of the skin-reflex. Bevan Lewis found that this reflex was present in only about 11 per cent. of his cases, whereas it was entirely absent in about 67 per cent. Associated with the pin-hole pupil in this disease is loss of the power of accommodation, especially in the later stages of the paresis. Rarely, in consequence of optic atrophy or other grave defect of vision, one or both pupils may be widely dilated. Gudden states that a little under five per cent. of his cases of paresis exhibited double mydriasis. In the early stages of paresis the ophthalmoscope will reveal that the fundus of each eye is normal. Swanzy states that in consequence of a number of cases that have come under his observation he has been led to think that the full value of the Argyll-Robertson pupil in relation to nervous diseases has not yet been fully appreciated. Dr. Branwell states that in the vast majority of instances in which he has observed the Argyll-Robertson pupil it has been associated either with locomotor ataxia or paralytic dementia.

Gowers has expressed the opinion that this pupillary symptom proves that a degenerative process is at work in the nervous system which raises a strong presumption that the process is of syphilitic origin. We know that the two most potent causes of locomotor ataxia are heredity and syphilis. We also know that these two etiological factors are by far the most frequent ones in paralytic dementia. While the majority of physicians look upon locomotor ataxia and paralytic dementia as having nothing in common, it seems to me that the facts related above and many others, justify the German and French physicians in regarding the two diseases as fundamentally alike, in spite of the fact that in tabes the spinal symptoms are quite constant, whereas in dementia paralytica they are of an ever shifting character. It has been observed that while there is a diminution in the intensity of the oscillations of the pupil (hippus) in locomotor ataxia, their rhythm is unchanged, in paralytic dementia the rhythm is lost. Yet in spite of these differences dementia paralytica has been called the half-brother of locomotor ataxia.

It should be borne in mind that paralytic dementia and *neurasthenia* have a large number of similar and misleading symptoms. In each heredity is important, and they belong especially to the middle period of life. In each a syphilitic history is very prominent, and sexual, alcoholic, and mental excesses are noted. Insomnia, headache, vertigo, irritability, indigestion, and inability to concentrate the mind are prominent symptoms.

A number of cases that have been diagnosed and treated as neurasthenia have ultimately turned out to be cases of paralytic dementia. In differentiating these two diseases the pupillary symptoms are of the utmost importance. In the eye, mental, and nerve clinic of the Charité in Bonn, Thompson found that of those patients who developed paralytic dementia or locomotor ataxia, 90 per cent. had reflex immobility of the pupil to light. Berkeley states that many of these patients went to the various clinics under the impression that they had neurasthenia, and he admonishes the physician to think twice before contenting himself with a diagnosis of neurasthenia in a man or woman who in middle life shows well defined reflex pupillary disturbances, for the prognosis of insanity is ominous. It would be extremely difficult to differentiate paralytic dementia from certain forms of chronic alcoholism were it not for the help of eye-symptoms. In both of these diseases along with the lowered intelligence, defects of speech and writing are noted, as also anomalies of sensation, tremors, and epileptiform seizures. Also in those patients who have peripheral neuritis the patellar reflex is abolished. But the presence of paralytic myosis or contraction of the pupil and other eye symptoms would point strongly to the presence of paralytic dementia. The prognosis in paralytic dementia is altogether bad. Even those cases which apparently recover for a time and are able to return to business for a year or two, show the lurking presence of the disease by the inactivity of the pupil, associated with slight tremors of the hands, and the abolished or increased knee-jerk.

Occasionally there is inequality of the pupils in encephalopathia saturnia; also at times in Morvan's disease or syringomyelia.

In Parkinson's disease of paralysis agitans the pupils are normal, the myosis that is noted being common in healthy elderly people.

In Landry's disease or acute ascending paralysis, although eye-symptoms are rare, there has been observed either a loss of the light reflex or a dilated pupil. In myotonia congenita or Thomsen's disease, and also in hereditary ataxia or Friedreich's disease, no pupillary symptoms have been observed.

A knowledge of the different phases of mobility of the iris in chloroform narcosis is of the utmost practical importance, and affords a brief but very instructive review, of the philosophy of pupillary changes. In the excitation stage of chloroform anesthesia the drug first dilates the pupil by stimulating the pupil-dilating center, thus inducing spastic mydriasis, then later the center is depressed, and still later, as the chloroform narcosis becomes more pronounced the pupil-dilating center is completely inhibited, so that wide dilatation gives place to medium contraction, through unopposed tonic activity of the oculomotor nucleus

and we have paralytic myosis. The narcosis becoming more pronounced the pupil-contracting center is stimulated and produces the "pin-hole" pupil or spastic myosis. As the patient is carried into the condition of profound surgical anesthesia there is a slight dilatation of the pupil due to commencing inhibition of the pupil-contracting center in the gray floor of the Sylvian passage. Should a marked dilatation of the pupil now occur, especially a sudden one, it is a danger signal and indicates that inhibition of the pupil-contracting center has been superseded by paralysis of this center, and admonishes us that the life of the patient is in grave jeopardy (paralytic mydriasis).

MEDICAL PROGRESS.

SURGERY.

Removal of the Semicircular Canals.—The excision of this portion of the ear for the treatment of unilateral aural vertigo is an operation attended by considerable risk, but capable of affording very great relief in certain chosen cases. RICHARD LAKE (*Lancet*, June 4, 1904), cites the history of a woman, twenty-one years of age, who had suffered from aural vertigo complicated with vomiting for five years. Deafness and tinnitus were both gradually but certainly increasing. The use of suitable glasses made no difference whatsoever in the frequency of her attacks. She experienced no constant dread of falling in any particular direction. She had been given almost every conceivable drug for the relief of the condition, among others, hypodermic injections of pilocarpine, having been used to their full limit. An ordinary mastoid operation was first performed with the exception that the innermost portion of the posterior wall was not removed. The temporal opening being advanced forward, upward and backward. The malleus and incus were removed, after which the upper and outer surfaces of the external semicircular canal were exposed. The superior canal was then brought into view and removed with a medium-sized burr. The posterior canal was then burred away entirely. The shock from this operation was very profound. For forty-eight hours the patient lay coiled up on the right side in the position commonly ascribed to patients suffering with cerebral irritation. The eyes were tightly closed, but the balls moved erratically. On the seventh day she sat up. On the tenth day she was able to take a few steps and in two weeks she could easily walk twenty yards. She could turn only toward the sound side. If she attempted to turn to the operated side she fell toward the sound. At the end of four weeks she was able to do everything without fear of falling. Since the fourth day there have been no movements of the eyes, abnormal in character. For the past three months there has been no return of the vertigo, and this may be looked upon as a great achievement, inasmuch as the patient was entirely incapacitated by her disease. It appears justifiable from the history of this case to believe that there are many which would respond to similar treatment in a similar gratifying manner, the important point being the question of indication for operation. The question for interference with the hearing is not a deterrent, because these patients apparently are not made much worse by operation, and, indeed, if they were, the relief would justify the entire destruction of the organ of hearing on one side. The operation itself is not difficult except when made so by anatomical anomalies and irregularities. Probably it is impossible to avoid entirely the evidences of cerebral irritation and the eye symptoms, although in the author's case it is believed that the use of Lister's strong solution was in part responsible for the phenomena described. He recommends, therefore, that when this operation is done, a mild antiseptic wash should be used, because it has been shown that chemical irritation of the parts produces more reaction than actual section.

Disinfection of the Skin.—Animated by the idea that the source of infection in operative wounds was to be found in the patient's skin as often as in the surgeon's hands, E. W. SIEKEMEIER (*Archiv. f. klin. Chir.*, Vol. 73, No. 1) has made a series of experiments with this in mind. He recommends as the result of these observations that the patient be cleaned outside of the operating room and an abundance of flowing water be used. He found that after fifteen minutes of cleaning a large number of bacteria would be left on the skin, unless a brush were used. After the use of the latter a marked diminution in the number of bacteria was found. Tincture of green soap is a most valuable adjunct, but can be rendered much more effective if employed after one or more washings with ordinary soap.

Experimental Studies on Entero-anastomosis.—As the result of experiments made in the higher animals, T. SATO (*Archiv. f. klin. Chir.*, Vol. 73, No. 1) has found that if two sections of small intestine, or stomach and intestine, be held in apposition, with the outer layers removed so that the mucous surfaces are exposed, no communication between the lumena of the two will result, unless some destruction has taken place. The resistance of the mucosa is of such a high grade, that a mere exposure of a considerable segment, or the approximation of two such, never leads to perforation. In addition to producing apposition it is necessary to reduce the nutrition of the mucosa by chemical or thermic irritants, and thus to bring about a necrosis. For this purpose the author prefers the nitrate of silver stick to the actual cautery.

Modified Method of Stitching in Bassini's Operation.—It is well known that one of the most objectionable features attending this operation is the possibility of stitch infection in the lower tier of stitches. ROBERT PORGES (*Zentralbl. f. Chirurgie*, May 28, 1904) states that while the usual period of convalescence from a non-infected operation may be conservatively placed at three weeks, the period is lengthened to from six to fourteen weeks if the sequel under consideration subvenes. He states that not only in his work, but in the work of some of the ablest operators in Vienna and other parts of Europe, so much attention has been bestowed upon this subject that he has developed a method of placing the deep stitches so that if infection occurs in them, immediate drainage may be had in a more convenient manner than as they are at present inserted. The operation is done exactly as Bassini does it until the beginning of the deep sutures, which unite the internal oblique to Poupart's ligament. These are inserted, but are not tied in the usual way, being made fast to a fine piece of silk, which is carried out through the wound together with the terminations of the deep stitch. The superficial suture is put in, in the form of a figure of eight, so as to include the external oblique and the skin. The article is well illustrated so that the method of introducing the stitches is easily understood. All the deep stitches, when applied after this method, lead to the outside, an obvious advantage in cases of infection. When the wound is closed, the figure-of-eight stitches appear at intervals, while the deep stitches are brought out through the wound, held by artery forceps. When it is desired to remove the stitches, these are opened and the fine silk, which was previously mentioned as being

brought to the surface, with the terminations of the deep stitches, is used as tractors. The author states that this method can be pursued without any considerable loss of time and that he has found it satisfactory in every detail.

Crepitus from the Scapula.—This interesting condition has been alluded to by few writers, and the case reported by AXMANN (*Deut. med. Woch.*, June 23, 1904) is therefore worthy of attention. His patient was a boy of eighteen in whom a loud crepitus gradually developed in the right shoulder, although the boy was otherwise in good health and had sustained no injury. On lifting the arm, the crackling sound could be heard for several yards. Nothing was heard on passive motion and muscular effort seemed necessary in order to elicit the noise. The X-rays failed to show any abnormalities. No symptoms were complained of. In Kuttner's report, 22 cases of this condition are mentioned, and the following are stated as etiological factors: Bony deformities in the scapula or thorax which are the result of tuberculosis or syphilis; ankylosis in the shoulder joint; paralysis with muscular atrophy; and abnormal diverticulae from the synovial membrane. In this case, however, none of these lesions could be demonstrated.

Determination of Renal Capability.—It is of prime importance that a careful examination of both kidneys be made before attempting a radical operation on one. J. W. CHURCHMAN (*Maryland Med. Jour.*, July, 1904) says the usual methods of urinary analyses, actinography and cystoscopy as well as subsequent exploration of the healthy kidney may give no clue as to changes in kidney tissue which might impair the working capacity of the organ. The usual urea tests are inaccurate for more than the urea is measured, but the great difficulty of accurate tests renders them useless clinically. Inferences regarding normal or subnormal functional capacity of the kidneys are not warranted from a single observation, since wide daily variations may occur in kidneys doing physiological work. Routine urea tests even when continued over relatively long periods are not precise since maintenance of nitrogen equilibrium does not necessarily speak against nitrogen retention, likewise a deficiency in nitrogen output does not of necessity mean retention of toxic products. The ordinary tests, however, should not be disregarded, as they have the clue-giving value of all rough methods. It is suggested that some substance be injected into the organism, easy of detection in the urine, and that the renal capacity be judged from the manner in which such a substance is excreted. Two such methods are described. The technic of the first consists in the subcutaneous injection of 5 m.g. of a solution composed of equal parts of phloridzin and sodium carbonate, the bladder having previously been emptied. In normal cases sugar appears in the urine in a half hour, the quantity being about 3 per cent. In general, disease is indicated by (1) absence of sugar after a reasonable interval; (2) delay in its appearance; (3) a small percentage of sugar. In the second method one c.c. of a sterile 1-20 solution of methyl blue is injected deeply into the buttocks, after emptying the bladder. The urine collected every half hour until the blue appears and then every half hour until it disappears. Normally the blue appears in the first hour and disappears in 36 to 48 hours. The time of appearance, intensity, duration and course (cyclic, polycyclic or intermittent) of elimination must be considered before a conclusion can be reached. By determining the freezing point of urine and comparing it with that of blood (cryoscopy), the molecular content of the urine may be estimated and an index of osmotic pressure given. A test tube containing the urine, a finely-graded thermometer and a stirring wire, is suspended in a freezing mixture. When the liquid freezes the latent heat given off causes a sudden rise of mercury, the freezing point is determined by the point from which the mercury rises. Urine normally freezes between -0.9° and -2°, that from healthy kidneys has a lower freezing point than that of diseased kidneys. Blood freezes normally at 0.56°, a lower freezing point means renal insufficiency. The practicable methods of determining renal capability are not accurate, but the accurate methods are as a rule not practicable. Of the methods comparatively simple in technic cryoscopy is recommended as giving best results, its chief advantage being that it gives an index of total waste products instead of that of a single constituent.

MEDICINE.

Pseudo-ascites After Chronic Enteritis.—L. TOBLER (*Deut. Arch. f. klin. Med.*, Vol. 80, Nos. 3 and 4) has noticed that children suffering from chronic enteritis are frequently brought to the physician for an increasing swelling of the abdomen. If these emaciated patients are examined all the physical signs of free fluid in the abdomen may be obtained, that is, the skin is tense and shiny, undulation is present and movable dulness may be elicited. The symptom-complex strongly suggests tuberculosus peritonitis, yet the areas of dulness are liable to vary from day to day. If such patients are operated on there is generally not a trace of fluid in the abdomen. The condition is due to a relaxation of the mesentery, so that the intestines, filled with fluid contents, will sink to the most dependent portions of the abdomen.

Painful Obesity.—Three new symptoms have been added by B. SCHWENKENBECHER (*Deut. Arch. f. klin. Med.*, Vol. 80, Nos. 3 and 4) to that peculiar condition known as adipositas dolorosa: general muscular weakness, physical anomalies and hemorrhages. Since the obesity is general, the disease should not be confused with painful lipoma. Very often a diagnosis of rheumatism or hysteria is made, as the patients may look well, yet constantly complain of pain. The treatment calls for rest in bed, followed by baths, massage, exercise and antifat diet. The only lesions which the author could find in excised portions of the skin were an abnormal increase of fatty tissue in the cutis. Probably this infiltration, together with the stasis of blood and lymph, is responsible for the pain. In some cases lesions of the thyroid, hypophysis and of Goll's tract were found, but it is doubtful if they bear any etiological relations to the disease.

Trypanosoma Disease in Man.—The organism known as *Trypanosoma* has for some time played an important role in animal pathology, and isolated cases of this infection in man have been observed for two years. It is now generally conceded that there are two distinct forms of the disease, depending on the localization of the germ: trypanosomasis proper and the sleeping sickness of negroes. In a case of the former, observed by A. GUNTHER and C. WEBER (*Münch. med. Woch.*, June 14, 1904), the chief symptoms were: A chronic course extending over years, recurrent periods of irregular fever, gradual loss of strength and anemia, local transient edema, a peculiar affection of the skin, swelling of the liver and spleen, increased pulse, occasional dyspnea and an irritability of the vascular system. The skin manifestations were irregular, red spots on various parts of the body, which disappeared on pressure. An absolute diagnosis can always be made by finding the worm-like parasite in the blood during the febrile period. In addition, the blood may be injected into rats and apes, which are very susceptible. The leucocytes are generally diminished with a relative increase of the mononuclear elements.

Diagnosis of Typhoid Fever.—Statistics have been collected on all typhoid cases during the last eleven years by F. WESENER (*Münch. med. Woch.*, June 7, 1904), who gives the frequency of the ordinary symptoms as follows: Palpable spleen 60.4 per cent., roseola 78.5 per cent., diazo reaction 85.2 per cent., Widal reaction 75.1 per cent. It seems that the most constant symptom of typhoid is the diazo reaction and its absence during repeated examinations argues for some other disease. Its chief disadvantage is its occasional presence in non-typhoid conditions, and this also applies to the Widal, for the author obtained distinct agglutination also in some cases of malignant endocarditis, influenza, miliary tuberculosis and sepsis. Even improved bacteriological technic and special culture-media do not render the diagnosis always easy, especially since such closely allied diseases as paratyphoid have been recognized. The diagnosis of typhoid is also discussed by D. ROLLY (*Münch. med. Woch.*, June 14, 1904), who lays great stress upon the bacteriological examination of the blood. The technic is very simple: Twenty c.cm. of blood are removed from a vein at the elbow, mixed with liquefied agar and poured into Petri dishes. The colonies will develop in one or two days and can be identified with agglutinating animal serum. A positive result was obtained in 88 per cent., including a large number of early cases, where the Widal was still negative. The great drawback of the method lies in the fact that it is hardly applicable for the ordinary practitioner, since it necessitates a bacteriological laboratory. The blood may, however, be diluted with a suitable fluid which does not kill off the germs, and then be sent to a bacteriological laboratory. For this purpose the author recommends a solution of five grams of peptone and fifty of glucose in 100 c.cm. of water. Twenty c.cm. of blood mixed with twenty c.cm. of this sterilized solution will not coagulate and the germs will keep until the following day. In order to obtain a permanent typhoid culture for the Widal, toluol or formuol is added to a five-day-old culture. The agglutination occurs in the same dilution as with live germs, but somewhat later; it may be observed both micro- and macroscopically.

Tuberculous Pericarditis.—The rarity of this condition is illustrated by the fact that among 1,077 autopsies, performed at the University of Palermo, SCAGLIOSI (*Deut. med. Woch.*, June 9, 1904), found it present in only one instance. The patient, a woman of sixty years, had died as the result of a pyelonephritis. After death a moderate amount of fluid was found in the pericardial cavity and the lining membrane was irregularly studded with small nodules, which were proved to be tuberculous. No other tuberculous lesions were found and the writer thinks that the patient's age was the predisposing factor in determining this localization, for, as is well known, the cardiac vessels in the aged are more or less diseased and thus offer a point of lessened resistance to the invasion of the tuberculous process. That primary tuberculous pericarditis may exist as a disease entity is therefore claimed by the author to be a rational assumption.

Tuberculosis in the South of Ireland.—This portion of the British Isles has as yet been sadly neglected in the application of sanitary and hygienic methods. J. DARLEY WYNNE (*Brit. Med. Jour.*, May 28, 1904), states that unfortunately, according to the reports of the Registrar-General for 1902, it is shown that while in England and Scotland the death rate from all forms of tuberculous disease has fallen to a remarkable degree in the last thirty-nine years, in Ireland it has actually increased. In 1864, it was throughout the island 2.4 per thousand, whereas in 1900 it reached a maximum of 2.9 per thousand. In the urban districts, having a population of 10,000 and upward, the rate was 4.29 per thousand in 1901 and 4.1 in 1902. The highest death rate from tuberculosis was in Clonmel, where it reached a maximum of 6.5 per thousand in 1901. In 1903 it was somewhat lower, but still the rates were extremely high. If other diseases were proportionately high in this particular township the population would soon become extinct, but as a matter of fact, death from other causes is not in proportion to the tuberculosis death rate. The cause for this condition of affairs is to be found in the type of Irish cabin. One enters a yard outside of the house and is obliged to go to the front door through a pond of filthy wet manure. The interior of the cottage is lighted by a dim light in which one can, after becoming accustomed to the gloom, see from six to a dozen half-naked children huddling over the embers of a peat fire. The floor is of mud and damp. There is but one window; this serves to keep out the air, for it is always shut. Contrivances which look like sailors' bunks are fixed against the wall in an inner room. They are carefully curtained to keep out light and air and are smothered in dirty bedclothes. A single window lights this room. This is where the unfortunate consumptive spends his last hours of life and where he breeds millions of germs for the remainder of the family to die from later on. In towns of the type of Clonmel there is no overcrowding. The backyards are about 20 feet long by 15 feet wide. In one corner, there is usually a faucet through which the town water supply can be obtained. Beneath it the trap is almost always defective and the yard is ill and irregularly paved. Of drainage systems, both for human and animal excrement, there is usually not the slightest trace. The receptacles in which this material is contained, are emptied at irregular and inadequate intervals, since the authorities do not oblige land owners to attend to this important factor. By a most pernicious arrangement, the filthy material, when these pits are cleaned, has to be removed directly through the house. It is probable that the horse and cattle fair, which takes place every month in Clonmel, is a very important factor in making the mortality from tuberculosis so high. Vast numbers of cattle are herded together for hours all over the principal streets and up against the shop fronts, and when the day is wet, the filthy condition of the roads makes them impassable. The milk supply of these towns is probably a further factor in spreading the disease, unless the views of Koch be correct, for vast numbers of the herd are infected with tuberculosis, no effort being made to regulate this part of the food supply of the commonwealth.

Atypical Lymphatic Leucemia.—A most peculiar case of lymphatic leucemia has been observed by A. WOLFF (*Wien. klin.-therap. Woch.*, June 26, 1904). The blood examination at first suggested pernicious anemia, since the red cells were below one million and the leucocytes not numerically increased. The absence of deformed and nucleated cells and the preponderance of large mononuclears made a leucemia of lymphatic type more probable. The clinical symptoms were only those of anemia and at autopsy the lymph nodes were atrophic rather than swollen. The diagnosis was, however, settled beyond doubt by the presence of lymphatic changes in bone-marrow and liver. In a second similar case there were two million cells, a normal number of leucocytes, of which 50 to 75 per cent. were mononuclear, a large spleen and a very chronic course with remissions.

Herpes Zoster in Pneumonia.—In 30 to 40 per cent. of all cases of croupous pneumonia, B. RIEHL (*Münch. med. Woch.*, June 21, 1904) found a well-marked herpetic eruption. The male sex seems to be affected more often than the female. Usually one and

the same individual is affected only once and the eruption generally makes its appearance on the third or fourth day of the disease, in the area of the second and third branch of the fifth nerve, preferably the infraorbital. Quite exceptional locations are about the eyes, the forehead, neck, anal and coccygeal regions and the extremities. During infancy and old age herpes is hardly ever seen. It is a noteworthy fact that mild cases show the most abundant vesicles, while severe and fatal cases are almost free from skin lesions, so that they possess prognostic importance.

Metabolism in Chlorosis.—The metabolic changes which occur in chlorotic patients, as manifest by the examination of urine and feces, may be summed up as follows, according to G. VANNINI (Virchow's Archiv, Vol. 176, No. 3): The urine is generally normal as far as amount, specific gravity, molecular concentration and acidity are concerned, but abnormal in that a retention of nitrogenous principles seems to occur and that these different principles bear an abnormal relation toward each other. The amount of ether sulph. acid is not increased, while an excess of neutral sulphur is common; the earthy phosphates are diminished and the amount of chlorides varies. Subnormal amounts of chloride are found in the fecus, but the amount of ash and its contents of lime, magnesia, soda and potash, does not suffer any change.

Pseudoleucemia Lymphatica.—(*Gazz. degli ospedali*, June 19, 1904.) A male patient, aged fifty-seven years, with negative family history, denying syphilis and alcohol developed painless swellings of the lymphatic glands of the neck, with some constitutional symptoms, both of which disappeared completely in a week. The glandular enlargement returned, and the neck became much enlarged. Occasional chills and increase of temperature were noted. Emaciation and anemia developed. Physical examination was negative, except the presence of a hemic murmur. The white corpuscles were 10,000; the red, 3,200,000. Glandular swelling increased; there was a higher temperature, physical weakness, a trace of albumin in the urine. The spleen gradually increased in size. Death occurred three months after patient entered the hospital. Autopsy revealed the following facts: Marked anemia of all organs. Fatty degeneration of heart and liver, spleen much increased in size, pulp soft, red, with four or five areas of infarcts. Kidney enlarged, pale somewhat sclerotic; medulla of long bones, lymphoid, pale red, not fatty. The lymphatic glands are enlarged, the peribronchial and peritracheal form a hard mass. Other enlarged glands show increase of fibrous tissue, or parenchymatous enlargement. Under the microscope marked change of structure was seen, notably endothelial cells, large and small lymphocytes and eosinophiles. Some areas closely resembled lymphosarcoma.

THERAPEUTICS.

The Crisis and Treatment of Pneumonia.—A new method for treating this disease is advocated by W. J. GAILBRAITH (*Jour. Am. Med. Ass'n.*, July 9, 1904), which is not offered as a specific, but is claimed by the author to have greatly reduced his former mortality. His experience leads him to believe that the so-called pneumococcus may be associated with the etiologic factors of pneumonia, but is not its specific cause. The first attention rendered the ordinary cases admitted to his hospital (in Sonora, Mexico), is a warm bath and a saline cathartic. Quinine and iron are given under the following indications: When the temperature has reached 105° or over, 60 grains of quinine sulphate are administered, followed in one-half hour by half this amount, 30 grains, and in another half hour, by 15 grains. At this time the administration of tincture of iron chloride is begun in doses ranging from 7 to 15 minims, depending on the date of the disease and the condition of the heart. On the first or second day of the attack, 10 minims are given, and this is increased one or two drops each day up to the sixth or seventh, unless the pulse remains full and strong. When the temperature is 104°, the author gives 50 grains, and follows the same course. When it is 103°, 30 to 40 grains are given. During convalescence combinations of the following were found to be of value, elixir of iron, quinine, and strychnine, guaiacol and cod liver oil. But best of all at this time is thorough ventilation and sunlight, with plenty of milk, eggs and beefsteak. The term crisis he considers a misnomer, and presents pneumonic cardiectasis as a more descriptive term, which attracts attention specifically to the overdistended and disabled heart. Stimulants are contraindicated during this time, as they increase the mechanical conditions that are distressing the patient.

A Case of Tuberculous Leprosy.—There are said to be over one thousand lepers in Russia, although the exact number is not known, and they are mostly to be met with in the villages. G. LELEWSKY (*Prakt. Vrach*, Nos. 9 and 10, 1904) considers leprosy as a malignant constitutional disease, almost always of a chronic nature. The case reported by him was that of a man of twenty-seven years, who became ill five years before at sea during a storm, when he caught a severe cold. The advance was gradual though well marked. The skin presents at places thickened spots of a dark bronze color, especially noticeable at the tip of the nose. There is an almost complete absence of hair over the eyebrows and lashes. The ears and lips are considerably thickened; the face presents the typical leonine appearance. There is a beginning keratitis in both eyes, the commencing pannus leprosus. The skin of the arms is covered here and there with spots of a dark bronze color, same to be seen on the feet. There was a large grayish-white spot over the palate extending to the uvula. The epiglottis is thickened, and of the same color. Patient complains of dryness in the mouth and throat. As regards treatment, patient was given ol. chaulmoogra in doses of 5 to 20 drops three times a day, but as he was later lost sight of the effect of the medication could not be watched. It might add to the interest of the case if the author had attempted to prove the existence in this case of the lepra bacillus, so that the diagnosis might have been established beyond any peradventure.

Value of Water in Disease.—Attention is called to the importance of a plentiful administration of water, especially in those diseases accompanied by a rise in temperature, by E. HOMBERGER (*Berl. klin. Woch.*, June 20, 1904). For by this method the most distant cells may be reached and affected. Water is the great natural curative measure and the easy method of application should not cause it to be neglected. As cellular pathology demands a cellular therapy, this agent seems to be the most rational means to attain that end. In the presence of fever especially, the administration of water should be made a particular effort, as there is an insufficient quantity present in the system, and as the body is slow to give this up, a diminution in the quantity of sweat and urine results. The author claims that perspiration is only restored when the temperature begins to drop and the superfluous water is no longer needed. Where toxins have circulated in the blood for a considerable period, the giving of water is of great value, but where these products leave the system rapidly and unite with the cells, it can be of little avail.

Treatment of Snake Bites.—Since 1869, permanganate of potash has been used as a chemical antidote in cases of snake-bite. An experimental investigation of the value of this substance has been made by SIR L.

BRUNTON, SIR J. FAYRER, and L. ROGERS (*Proc. Royal Soc.*, May 28, 1904). Brunton devised an instrument that might be used in cases of snake-bite. It consists of a lancet-shaped blade about half an inch long, long enough to reach the deepest point of a bite by the largest snake. It is set in a wooden handle about an inch and a half long, which is hollowed at the other end so as to form a receptacle for the permanganate. Two wooden cups are fitted over the ends of the instrument, one to keep in the permanganate, and the other to protect the lancet. Such an instrument might be carried in the pocket and used by even the ignorant natives of the snake-infested locality. The plan proposed is to make a free opening at the site of the bite and to rub in crystals of permanganate. The limb is first surrounded with a tight bandage above the bite. The puncture of the teeth should be freely cut into and the crystals of permanganate introduced and rubbed about, a few drops of saliva being added. The value of the above method of treatment was experimentally tested on animals. The venoms of nine varieties of snakes were employed. In the cases of each ten or more lethal doses, and in the most of them twenty lethal doses were neutralized by very small quantities of permanganate in solution, and thus rendered harmless. These experiments prove that this agent acts on every class of snake venom and renders them inert. The experiments were performed on rabbits, pigeons and cats.

PHYSIOLOGY.

Secretion of Acid by the Kidney.—A study of the mechanism by virtue of which the kidney excretes an acid urine from the alkaline blood, was made by A. R. CUSHNY (*Jour. of Physiol.*, June 30, 1904). The latter found that the reaction of the urine varies within strict limits in diuresis; it is never alkaline to phenolphthalein nor acid to methyl-orange, and thus corresponds approximately to the interval in reaction between mono- and di- sodium phosphate. The intravenous injection of most saline diuretics is followed by a marked fall in the percentage acidity, partly because the phosphates are present in only small amount, and partly because the absorption in the tubules is deficient. Phosphates injected intravenously give an acid reaction to the urine which is especially marked when the diuresis is partially prevented by increasing the absorption of the tubules. This is explained by the hydrolytic dissociation of the phosphates of the glomerular fluid, which permits of the absorption of the cation along with hydroxyl or carbonate anions; these are capable of permeating the epithelium, while the phosphate anion fails to penetrate it so freely and remains in the tubules along with the hydrogen cations replacing the original ones. The essential factors in the secretion of acid urine are (1) the presence of salts in the glomerular fluid which are capable of extensive hydrolysis and of which the cations can permeate the epithelium, while the anion fails to do so in equal measure, and (2) insufficient absorption in the renal tubules. The phosphates alone of the salts examined fulfil these conditions completely. The carbonates fail to do so because the anion is absorbed, and the borates satisfy the condition only in relation to phenolphthalein, since the anion is too weak to compete with the stronger anions of litmus.

The Coagulation of Milk.—The chemistry of the phenomena that underlie and influence the coagulation of milk has been carefully worked out by A. S. LOEVENHART (*Hoppe-Seyler's Zeitsch.*, March 5, 1904). Milk is curdled by the following causes: (1) Turning sour upon standing; (2) the latter together with heating; (3) the addition of acids to fresh milk; (4) fresh milk heated to 110° to 130° C. in a closed tube; (5) fresh milk heated with $CaCl_2$; the addition of rennet to fresh milk; (7) the heating milk to which too small a quantity of rennet has been added to effect coagulation; (8) milk coagulates during a storm (the cause of this is not yet understood); (9) electrolysis. In 1, 3, 4, 8 and 9, the coagulation is to be attributed to an acid which liberates casein from its union with calcium. According to Hammarsten, the effect of rennet is to cause a splitting of casein into lactalbumin and paracasein. This is very similar to casein and differs from it in being coagulated by calcium salts at ordinary temperature, while casein requires higher temperatures. The metals may be divided into three groups with respect to the action of this salt upon casein and paracasein. The first group which contains the strongest metals, as sodium, precipitate neither casein nor paracasein. The second group, which contain lithium, etc., precipitate paracasein rapidly from its solutions at room temperature, but casein only after standing a long time at 40° C. or higher. The third group coagulate both bodies promptly at room temperature, and include all the other heavy metals, as iron. The precipitating power increases progressively with the transition from the strongest to the weakest metals. The precipitation of paracasein by colloidal solutions as acids, salts and alcohol is brought about more easily than that of casein. There is no evidence that casein and paracasein are distinct substances, for all their differences are of a physical nature and indicate that these two substances are modifications of one and the same thing. Decalcified milk is coagulated by salts of the following metals; calcium, strontium, barium, etc., which fact indicates that probably the coagulation if mild is largely dependent upon a change in the arrangement of its mineral constituents. Acids are only the indirect cause of coagulation; the direct cause is calcium. The addition of ammonium oxalate to acid milk inhibits coagulation.

The Production of Hemolysins and Agglutinins by the Stromata and Liquid of Laked Corpuscles.—A series of experiments were performed by G. N. STEWART (*Am. Jour. Physiol.*, June, 1904), with the view of determining the effect of the injection of the stromata and of the substances which escape from the corpuscles respectively, in hemolysins, caused by various laking agents as regards the production of specific agglutinins and lysins. He found that the stromata and hemoglobin, containing liquid of colored corpuscles, laked by various agents (water, freezing and thawing, heat, saponins, foreign serum), cause, when injected into animals of a different species, the production of specific agglutinating and hemolytic substances. In general, the agglutinating effect is most marked after the injection of liquid. But the results do not warrant the conclusion that in the intact corpuscle the agglutinogen (the substance which causes the production of agglutinin) is all in the stroma, and the hemolysinogen (the substance which causes the production of hemolysin), all in the cellular contents (in Nolf's Sense). Corpuscles fully fixed by formaldehyde cause, on injection, the production of specific agglutinins, and to a smaller extent of specific hemolysins. Such corpuscles are capable of being agglutinated by specific sera.

The Comparative Physiology of Peristalsis.—A study of the peristaltic movements in the lower organisms (worms, etc.), leads W. BIEDERMANN (*Pflüger's Archiv.*, May 21, 1904), to conclude that direct muscular conduction plays no rôle in these phenomena. They are rather bound up with the integrity of the central nervous system and are the result of progressive segmental reflexes, in which any passive stretching of the muscle of any segment produces reflexly a contraction of the circular muscle, and probably a synchronous relaxation of the longitudinal muscle.

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A WEEKLY JOURNAL

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CANCER ETIOLOGY AGAIN.

SCARCELY has one apparently important contribution to the question of the etiology of cancer been made before another is announced that undoes something at least of the supposed significance of the previous work. At the beginning of the present year, as the result of an investigation conducted by a special commissioner Doctors Farmer, Moore and Walker in London announced that the real factor of cancer consisted in a transformation of the cells of normal adult tissues into modified reproductive tissues. Since reproductive cells are selected very early in embryonal life for the special purpose of carrying on the race, a reversion of other cells to this type later on in life might seem impossible, but the observations of these investigators apparently demonstrated that such a transformation actually took place. There is a diminution of the chromosomes in the cells of malignant tissue, just exactly the same as is noted in reproductive cells.

The mitotic changes in the cells of cancer have occupied attention for a considerable period. It has been recognized that the appearance of these cell changes had a special significance. Mitosis occurs much more frequently than in normal tissue, even when it is undergoing regeneration and certain anomalies in the mitotic figures are characteristically present. For a while it was thought that this heterotype mitosis, might be of a diagnostic value, but this idea is no longer accepted. The declarations of Farmer, Moore and Walker recalled attention to them and seemed to find the explanation of the whole process of malignancy in the anomalies observed in them.

The report of the cancer research fund of the Royal College of Physicians and Surgeons of London, which has been recently issued, does not accept the conclusion with regard to the explanation of cancer as a reversion of cells to the reproductive type. In the section on the cytology of cancer it is said that after careful observation the number of cells exhibiting mitotic changes varies very considerably in different tumors. The number of cells observed in mitosis bears no relation to either the rapidity of growth of the tumor or to the tendency for it to produce metastasis. In a word, although the observations with regard to the occurrence of anomalous mitoses are confirmed, there is no distinct relation between this cellular reproductive process and the malignancy of the tumor in which it occurs. In rapidly growing tumors with tendencies to degeneration it may be hard to recognize the presence of mitotic cells in any number.

In another way the question of the possibility of reversion to reproductive type causing malignancy has been carefully studied. Portions of tissues removed from the testes and ovaries of living animals that are known to be liable to cancer have been transplanted to other tissues without any serious result and absolutely without any sign of invasion of the surrounding parts by this foreign type of tissue. These observations, of course, only confirm what is known with regard to the transplantation of ovarian tissue, for in a large number of instances gynecologists have deliberately transplanted portions of the ovaries without producing any serious results.

This is the negative side of the report. The positive side is of distinctly as much interest. The zoological distribution of cancer is now being studied to good effect. Specimens obtained from nearly all the various forms of domestic animals are described in detail in the report. While, of course, it has been known that the cow, the dog, the horse, the sheep, the cat and the mouse are especially liable to suffer from cancer, it is now definitely ascertained also that the warmer blooded birds and the cold blooded fishes

are no exceptions to this rule. Specimens of cancer from the hen are shown, as also some from the trout. Wild and domestic animals seem to suffer equally from the disease, though, of course, there are more opportunities for its observation among the domesticated. An explanation for the occasional transmission of cancer, such as occurs from one lip to the other in epitheliomatous cases is to be found in certain experiments upon mice. Borrel's success in transplanting true cancer from mouse to mouse gave great hopes of an explanation of cancer etiology being reached in this way. The cancer research commission repeated these experiments in some 250 cases with a successful result in over 25 per cent. of the cases. If the tumor tissues were exposed to a temperature equal to that of the human body for twenty-four hours between the time of its removal from one animal to implantation in another, no successful results were obtained. Mechanical disintegration of the tissue by crushing in a mortar also prevented successful transplantation.

The nucleus of the cancer cells still continues to be a point of greatest interest. Some years ago von Hansemann, of Berlin, announced that the nucleus of cancer cells was characterized by having less chromatin than normal. It was somewhat in line with this idea that Farmer, Moore and Walker's work suggested the reason for this in a diminution of the number of chromosomes, because of reversion to the reproductive type. The present report confirms these observations with regard to the hypochromatic nucleus, but suggests that certain appearances within the nucleus are also important. In many carcinomata nuclear figures exist, which would seem to suggest that a conjugation of cells had taken place. If this were the case it can readily be understood that a new cycle of life and development would be begun, and that luxuriant reproduction of such tissues might be expected. Such cells would be likely to grow independently of their environment in the tissues and take on the essential characters of malignancy. They would infiltrate and deprive other tissues of nutrition, and if carried to a distance in the fluids of the body continue their independent existence producing the typical metastases. Whether this is to prove a pregnant hint for the solution of the most important problem, the etiology of cancer, remains to be seen. Once more we depart from the nature of micro-organisms to suspect some essential change in the vitality of the cells.

FORMS OF ARTHRITIS.

THERE is no doubt that so-called rheumatism in many of its forms is a motley assortment of most intractable diseases. Recently the general public has been treated to a book on a rheumatic man's adventures, the title of which is "Being Done Good," with Comments on the Advance made by Medical Science during the past 5,500 years in the Treatment of Rheumatism. The author claims to have tried every thing under the sun that physicians have suggested to him, or that he has obtained from tradition, or found in books, yet without obtaining any relief.

There is little question that there are many others who could tell a somewhat similar story, and there is even less doubt that this state of affairs will continue until it is more generally recognized and thoroughly appreciated that "rheumatism" is a very general term that has been made to cover a multitude of affections, most of which bear no relation to true rheumatic arthritis.

At the present moment much attention is being devoted to uric acid as a causative factor in rheumatic manifestations. There is even a *Uric Acid Monthly* (save the mark!), a proprietary sheet devoted entirely to the rubbish written about the so-called uric acid diathesis as the groundwork of nearly all the ills to which flesh is heir and many others in addition.

If the advertisements for various proprietary preparations, of varying hues of ethical coloring, are to be trusted, uric acid is the most important pathological element in the human body. If Macaulay's traveler from New Zealand should sometime, while nosing around the foundations of the Brooklyn Bridge, and the cornerstones of churches that are being laid at the present time, find copies of our present-day newspapers, especially the advertising columns, he will be sure to think that uric acid was the special curse of our generation and that ours might very well have been termed the uric acid age in medicine.

At the last meeting of the American Medical Association, however, nearly every one who took part in the discussion of arthritis deformans disclaimed utterly any belief in the uric acid theory of the origin of rheumatic or arthritic manifestations, and there was no doubt at all that the audience was thoroughly in sympathy with these nihilistic opinions, now voiced for many years in the MEDICAL NEWS.

On the other hand, there was quite as general an expression of opinion that true rheumatic arthritis can be recognized by the fact that it

leaves no trace of its presence in the joints. If lasting joint changes have occurred it is a sign that some secondary infection has been at work. Rheumatic polyarthritis has as distinct a tendency to run a definite course and get entirely well as does pneumonia, which it resembles in many other respects.

With regard to arthritis deformans itself, there remains the question whether this name may not itself cover a group of diseases rather than a single pathological entity. While the disease has attracted attention only in comparatively recent years its history goes back to the very earliest times, signs of its occurrence having been found on the bones of mummies and other preserved bodies all down the centuries, exactly in the form in which it is now observed. The changes in the spine which are especially characteristic of one clinical form of arthritis deformans have been found and leave no possible room for doubt in this matter. As seen at the present time, arthritis deformans exists in an atrophic and hypertrophic form and the question is still in doubt whether these are the same or different pathological processes. Occasionally atrophic and hypertrophic lesions are found in the same subject. This is rather rare, however. Good authorities insist that they have never seen one form of the disease change into the other. Like the question of hypertrophic and atrophic cirrhosis of the liver, there would seem to be need of further careful clinical observations in order to decide the question.

That all the deforming changes in joints are not due to arthritis deformans has now come to be very generally recognized. In some of the cases, especially where only one or two joints are involved, other forms of infective arthritis are more than suspected. While a monarthritis of the hip or shoulder-joint is not uncommon in older people and is considered to be a manifestation of arthritis deformans, in younger persons the confinement of the disease to a single large joint must always give rise to a suspicion of infection by some micro-organism, very frequently the gonococcus. The typical signs of arthritis deformans are the involvement of the small joints of the fingers and toes and a tendency to invade the submaxillary joint and the joints of the cervical spine. There is a general tendency to believe that the disease is infectious in its nature and at least one micro-organism has been isolated, which on injection into animals has produced deformity of joints, but the results of experimentation are as yet very fragmentary and untrustworthy. This, like other questions connected with the disease, must still remain as a subject for further investigation.

Unfortunately the treatment does not prove very promising. The warning not to do harm is the most important element in present-day therapeutics. It has been too often the custom to limit the diet of patients suffering from arthritis deformans, and the consequence has been a lowering of the general condition, which has invariably done harm rather than good. The appetite is usually a safe guide, though digestive disturbances must be corrected, and this may require careful selection and limitation of some one of the three ingredients of a mixed dietary, fats, carbohydrates or proteids. On the other hand, it is very clear that the salicylates, if used for any considerable period, do not relieve pain, while they do produce a tendency to anemia likely to react upon the patient's general health. Of the modes of active treatment the most important procedures consist in hot applications of some variety. Hot air and hot baths are the most helpful, though these alone are palliative rather than curative. As soon as the acute stage of arthritis deformans has passed, passive movement and massage are of value. The index for their employment must be the amount of pain they cause. Where pain is severe they are contraindicated. The prognosis of the disease is not as hopeless as has been thought, although there is a distinct liability to the recurrence of acute exacerbations of the disease, each one of which leaves the patient somewhat more helpless than before. The employment of the word rheumatism with regard to these recurring attacks has given a very bad name to a benign affection and has utterly confused the true therapeutics of the group of joint diseases. It has also often blinded the eyes of the young clinician and prevented his seeking for differentia in diagnosis.

ECHOES AND NEWS.

NEW YORK.

Infant Mortality High.—The Board of Health is having about 100 persons, including the entire summer corps of doctors and nurses, investigate the high mortality now prevailing among infants. In the week ending last Saturday there were 279 more deaths from diarrheal diseases than in the corresponding week of 1903, and this increase of infant mortality advanced the death rate for the week to 23.46.

The Paterson Drainage Canal and New York Bay.—Under the caption, "The Proposal to Make Our Bay a Cesspool," the *Sun* writes: "There are many

thousands of New Jerseyites who transact business in this city. They sleep on the other side of the North River and vote there. But apart from their families their interests lie on this side. When they travel they put 'New York' after their names on hotel registers. For all practical purposes they are New Yorkers. But for the existence of an imaginary line separating the two States, the places where they live would be a part of the greater city. What do these people think of the fight which is being made to drain a number of cities in northern New Jersey into our harbor and place the metropolis in peril of disease? Dr. Lewis, the head of the New York State commission which investigated the subject recently, says: There is one thing on which the commission, I think, is already fully agreed: that the waters of the bay and the rivers are already carrying all the sewage they ought to carry; and I have no doubt that the report of the commission will urge that the existing conditions at least remain stationary. While the old sewers cannot well be fitted with apparatus for the sanitary treatment of sewage, no new sewers should be opened without such apparatus. He added that the New Jersey scheme would put an open cesspool under our very noses. Fortunately, the decision of the New Jersey Supreme Court in favor of the constitutionality of the plan does not settle anything. New York will carry the matter to the Court of Errors and Appeals. And if beaten there, the final engagement will take place in the United States Supreme Court. An individual has to respect the rights of his fellow man. It is quite absurd for a community to imagine that it has any more right than an individual to ignore the safety, the peace of mind, the comfort of the neighboring community.

PHILADELPHIA.

Polyclinic Hospital.—Dr. William Sweet has succeeded Dr. H. F. Hansell as professor of Diseases of the Eye. Dr. Hansell, who resigned, becomes professor emeritus.

Death of Superintendent Smith.—Robert M. Smith, superintendent of the Philadelphia hospital, died July 20 from gastritis. O. A. Bohler, house agent, is at present acting superintendent.

Hospital for the Treatment of Cancer.—A number of physicians of this city, aided by several public-spirited lay citizens, contemplate founding a hospital for the treatment of malignant disease. A preliminary meeting has been held to formulate plans for the undertaking. The hospital is to adhere to no one method of treatment but any and all means that promise results will be tried.

Report of Food Commissioner Warren.—The report of State Dairy Food Commissioner Warren for 1903 shows that 1800 prosecutions were ordered because of infringements of the Pure Food Laws. From these were collected as fines and costs the sum of $93,450. The Pennsylvania Pure Food law of 1895 is said to be the most effective in the United States, but suggestions are made for its improvement so that prosecutions can be more readily brought to termination.

University of Pennsylvania.—The present medical hall of the University is to be renamed Logan Hall, in honor of a former trustee, and largely given over to other work. Most of the medical teaching will be given in the new medical laboratories; the old building will be used for anatomy, didactic lectures in surgery, and chemistry. The remainder of the building will be occupied by the school of finance.

CHICAGO.

Taking Care of the Children.—In 1870 the population of Chicago, by the United States census, was 306,605, and there were 4,600 deaths of children under five years of age reported. These figures show a proportion of something over 150 children's deaths in every ten thousand of the population. Thirty years later, that is, 1900, the same authority fixed Chicago's population at 1,698,575, and there were 8,285 under five years of age deaths reported. These figures show a proportion of less than 49 children's deaths in every ten thousand of the population, a decrease of more than two-thirds. A further analysis of the statistics shows better results for later periods. During the ten years 1884-1893 there were 89,633 deaths under five years of age in the City of Chicago. The average yearly population of this period was 954,676; therefore, the deaths under five years were 93.9 in every ten thousand of the population. During the ten years 1894-1903 there were 88,816 such deaths—or 817 fewer than in the first period The average yearly population of this latter period was 1,609,110 and the deaths under five years were, therefore, 55.2 per 10,000. These two sets of figures show a decrease of child mortality of much more than one-third (41.2 per cent.) in a single decade. While the average population increased 654,434, or 68.5 per cent., the under-five-years deaths were actually fewer.

Dinner to Dr. Earles.—A dinner was given to Dr. W. H. Earles, Milwaukee, Wis., July 16, at 8 P.M., at the Republican House. Dr. Wm. A. Evans, of Chicago, acted as Toastmaster. Toasts were responded to as follows: "Within Mailing Distance," by Rev. P. Fitzgerald; "Our Boyhood Days," by Mr. J. Emil Bench; "On the Campus," by Mr. John L. O'Connor; "Corduroy Roads," by Dr. M. H. Fisk; "Burning the Candle," by Dr. Truman W. Brophy; "Helpmates," by Prof. R. W. Sommer; "Colleagues," by Dr. G. A. Kletsch; "The Citizen," by Hon. David S. Rose, Mayor of Milwaukee; "The Surgeon," by Dr. John B. Murphy.

Suits Against Delinquent Milk Dealers.—Suits against 314 delinquent milk-dealers were successfully prosecuted during the week. The highest penalties, $50.00 and costs, were inflicted on two classes of offenders—those selling the low grade milk after warning, and those found guilty of using preservatives, chiefly formalin.

Dairy Inspection.—Dairy inspection improves in its results each week. Farmers offer to make affidavits that they will abandon the feeding of "wet malt," if allowed to ship their milk into the city, and in other ways show the good effect of the inspections. Of 146 dairies inspected during the week, 20 were found feeding the objectionable material, but promised to quit when the matter was fully explained to them. Sanitary instruction is even more important than sanitary legislation.

GENERAL.

New Sewage System for Paterson.—An opinion filed in the New Jersey Supreme Court, July 23, sustains the constitutionality of the law commonly known as the Passaic Pollution act. This law establishes a sewage system along the Passaic Valley, and provides for the construction of a trunk sewer from Paterson to the New York Bay at an estimated cost of $9,000,000.

Dispensary for Tuberculosis in Ohio.—Trustees of Western Reserve University have voted to establish an anti-tuberculous dispensary in connection with the medical school. The dispensary will register those who are infected with the disease, locate houses in which tuberculous people live, educate the people along fundamental hygienic lines, and its agents will visit the homes of the sick, giving instruction in the care of those afflicted with the disease.

Typhoid in the Navy.—The Navy Department received a despatch on July 23, from Rear-Admiral Barker

at Trieste, giving the first official information which has been received in regard to the typhoid fever epidemic among the officers and men of the American fleet. The despatch is as follows: "Battleships and Mayflower leave for Fiume to-morrow. European squadron separate. Mayflower will return to look after typhoid cases in hospital. Chaplain Isaacs, Capt. Dion Williams, Lieutenant Hudgins, Lieutenant Clement, Ensign Timmons and two sailors doing well."

University of Vermont.—The corner stone for the new medical building for the University of Vermont, was laid July 5, by Hon. John G. McCullough, Governor of Vermont. Short speeches were made by President Mathew Henry Buckham of the University; Dr. Henry C. Tinkham, Dean of the Faculty of Medicine; Dr. A. F. A. King, Professor of Obstetrics, and Ex-Governor U. A. Woodbury, who is one of the Alumni of the Medical Department. The graduating exercises occurred July 6, when fifty-five candidates received the degree of Doctor of Medicine. Those receiving honorable mention were Dean S. Drake and Thomas S. Brown of New Hampshire; Henry Raymond Biggar of New York; G. L. Closson of Vermont, and George B. O'Connell of Maine. Dr. O'Connell was president of his class and Dr. Biggar was elected valedictorian. The commencement being the one hundreth anniversary of the first in the University was a grand affair. Many alumni and former students were present.

Russian Hospital Trains.—The whole of the Manchurian and Siberian railway lines are systematically divided into sections and numbered. Hospital trains replete with the best surgical and other appliances obtainable are apportioned to these sections. The staff of each train includes three or four doctors, from six to ten nursing sisters of the Red Cross Society, and from thirty to forty hospital assistants. Each train has accommodation for two to three hundred wounded and sick.

Medical Society of the Missouri Valley.—The seventeenth annual meeting of this association will be held Thursday and Friday, August 25 and 26, at Council Bluffs, Ia. An entertaining programme is being prepared, and the adoption of a new constitution and by-laws, placing this society in line with the American Medical Association will make this one of the most important meetings in its history. The Committee on Arrangements extends a cordial invitation to the profession, and announces an excursion to Manawa Park on Thursday evening, where a smoker will be given for the entertainment of the visitors. Headquarters and meeting-place will be at Grand Hotel. Following is the preliminary programme: The Clinical Importance of the Reflexes, by H. Douglas Singer, Omaha; Congenital Dislocation of the Hip, by J. W. Cokenower, Des Moines; Recurrent Dislocation of Shoulder Joint and Its Treatment, by A. D. McKinnon, Lincoln; High Forceps Operations, by Mary Strong, Omaha; Temperature, Its Significance and Treatment, by A. E. King, Blockton; Treatment of Prolapse of Rectum, by A. C. Stokes, Omaha; Two Gall-Bladder Cases Presenting Some Unusual Conditions, by Harry Everett, Lincoln; Some Recent Progress in the Surgery of the Large Intestine, by J. E. Summers, Jr., Omaha; The Ocular Manifestation of Syphilis, by W. L. Kenney, St. Joseph; Affections of the Lacrimal Apparatus with Deformities Repaired by Parafin Injections, by Flavell B. Tiffany, Kansas City; Is It Mental Trauma? by S. Grover Burnett, Kansas City; Tinea Trichophytina, by R. C. Moore, Omaha; Treatment of Diabetes, by Le Roy Crummer, Omaha.

The American Association of Obstetricians and Gynecologists.—This Association will hold its seventeenth annual meeting at the Hotel Monticello, St. Louis, Tuesday, Wednesday, Thursday and Friday, September 13, 14, 15 and 16, 1904, under the following administration: President, Walter Blackburn Dorsett, St. Louis; vice-presidents, Aaron B. Miller, Syracuse, and William D. Haggard, Nashville; secretary, William Warren Potter, Buffalo; treasurer, Xavier O. Werder, Pittsburg; executive council, Edwin Ricketts, Walter B. Chase, A. Vander Veer, Lewis S. McMurtry, L. H. Dunning and Rufus B. Hall. The Hotel Monticello has been selected for the headquarters of the association, the management of which should be addressed concerning rooms and rates. The following list of papers has been offered: President's Address, by Walter B. Dorsett, St. Louis; Retrodisplacements as a Cause of Sterility; report of pregnancies following the Alexander operation, by Herman E. Hayd, Buffalo; Cyst Adenoma of the Pancreas, by L. H. Dunning, Indianapolis; Some Clinical Reasons for Advising Early Operations for Fibroid Tumors of the Uterus, by Rufus B. Hall, Cincinnati; Operative Treatment for Relief of Painful Menstruation in Virgins, by W. A. B. Sellman, Baltimore; The Relative Merits of Bag and Metal Dilatation, of Cervical Incisions, and of Cesarean Section in Cases of Accouchement Forcé, by E. Gustav Zinke, Cincinnati; Pseudomembranous Tubercular Peritonitis, by H. W. Longyear, Detroit; The Treatment of Acute Perforated Gastric Ulcer, by Henry Howitt, Guelph; Shall We Remove all Fibroid Tumors of the Uterus Upon Diagnosis? by Thomas B. Eastman, Indianapolis; Scar of Sigmoid Mesentery the Cause of Spastic Obstruction of the Bowels; with Report of Three Cases, by Hugo O. Pantzer, Indianapolis; Surgical Treatment of Cicatricial Atresia of the Vagina, by Charles G. Cumston, Boston; The Advantage of Limiting Artificial Interference in Obstetric Practice, by A. P. Clarke, Cambridge; Uterine Myomas, with Specimens, by Joseph H. Branham, Baltimore; Use of Antistreptococcic Serum in Septicemia and Scarlatina, with Case Histories, by A. G. Hamilton, Springfield, Neb.; An Unusual Case with Many of the Symptoms of Appendicitis, by Magnus A. Tate, Cincinnati; Conservation of the Natural Resistance of the Patient in Surgical Work, by Robert T. Morris, New York; Skeleton of an Ectopic Fetus Removed by Vaginal Cystotomy, by William D. Haggard, Nashville; Infantile Intestinal Diverticula, by J. W. Hyde, Brooklyn; Emergency Operations in Abdominal Surgery, with Cases, by A. Edwin Ricketts, Cincinnati.

Cancer Research.—The paper which the superintendent, Dr. E. F. Bashford, read before the general committee of the Cancer Research Fund in London, writes the *Post*, shows the wide and systematic process of the investigation by which it is hoped to discover the secret, and the cure, of this terrible affliction. Some important facts have been brought to light by the examination of tumors taken from various animals. Through the collaboration of private persons at home and abroad specimens of malignant new growths have been obtained from many lower vertebrates, including fourteen cases of carcinoma in fish. Two cases of malignant new growths in fish possess a special value, because derived from marine fish living in a state of nature, and similar interest attaches to a spheroidal-celled carcinoma discovered in a wild mouse. These are the first authenticated cases of cancer in wild animals. More than 2,000 specimens have been examined, secured from various subjects: Human, 266; horse, 116; cow, 99; dog, 247; cat, 43; pig, 8; frog, 6; bird, 13; mouse, 850; fish, 80; rat, 28; rabbit, 32; sheep, 8; goat, 7; bull, 1; miscellaneous, 329. In this way it has been proved that cancer pervades the whole vertebrate kingdom and presents constant fundamental characters. The

great diversity of the food, habitat, and conditions of life generally of the animals in which cancer occurs indicates that such external agencies have no causative influence. The origin of cancer has to be sought in the life-processes of the cells, and it has been demonstrated that a transplanted tumor will grow only on an animal of the species from which it was taken. There is much significance, too, in the discovery of the conjugation that occurs between the nuclei of cancer cells, as it points to the nature of the problem which has to be solved before growth can be prevented. Dr. Bashford's report goes on to say that there is no evidence to support the theory that certain countries or races of men are immune from cancer. This notion is ascribed to insufficient investigation. Thus the fact that there are more cancer cases in English than in Irish hospitals is due to the lack of competent medical supervision in the latter country. By the aid of the British Colonial Office, specimens of malignant new growths have been obtained from the natives of regions of Africa in which cancer was not known to exist, while through the Foreign Office, the Colonial Office, the India Office, the Egyptian Government, and private observers cancer has been found to be much more frequent in many tribes than it was suspected to be. Fortunately, there are no facts to support the widely spread belief that there has been an actual increase in cancer mortality. Dr. Bashford points out that among 1,786 new growths removed from the human subject in 1904, and supposed to be malignant, there were 127 in which the diagnosis was not confirmed by microscopical examination. In these the characters of malignancy were only simulated, and this, says the doctor, explains many reputed cures of cancer. Inasmuch as many malignant growths present no specific symptoms by which their nature can be placed beyond doubt, the report strongly advises the earliest possible operative interference, even in the case of new growths which may not appear to be malignant. There is no way, it appears, of positively proving them to be beneficient, a dictum which is likely to revive some almost forgotten apprehensions.

OBITUARY.

SIR JOHN SIMON, K.C.B., former president of the Royal College of Surgeons and of the Royal Society, is dead. He was born in London in 1816 and became senior assistant surgeon in the King's College Hospital, in 1840, when only twenty-four years old. Seven years later he was appointed lecturer in pathology at St. Thomas's. He soon established a great reputation by his writings on pathology and therapeutics, and began to devote his best energies to the work of sanitary reform. Being appointed Health Officer of the city of London, he was practically the father of most of the important sanitary legislation of that period. He pointed out the true moral of the several visitations of cholera, with which London was afflicted between 1845 and 1855 and so created a public sentiment which compelled the Government to take necessary precautions. For twenty-one years he held the post of central medical officer, and during that time presented a series of reports to the Privy Council, which may properly be described as invaluable. One of the most important of them was in defence of vaccination. British and European universities honored him with degress, and he was a member of innumerable medical and scientific associations. In spite of his activities in behalf of sanitation, his multifarious reports, and his professional occupations, he published many volumes on miscellaneous subjects, remarkable for their varied erudition and their admirable style. He devoted such leisure time as he could secure to the study of art, metaphysical literature and Oriental languages. Queen Victoria made him a K.C.B. on the occasion of her first jubilee in 1887.

CORRESPONDENCE.

OUR LONDON LETTER.

(From Our Special Correspondent.)

LONDON, June 25.

KING'S BIRTHDAY HONORS—THE BRITISH MEDICAL ASSOCIATION—THE PROFESSORSHIP OF MEDICINE AT OXFORD—DOCTORS AND THEIR FEES—A RIVAL TO LORENZ—THE GENERAL MEDICAL COUNCIL.

THE list of "honors" published yesterday on the occasion of the King's official birthday (his real birthday is November 9, but he chooses to have it celebrated on June 24, so as not to clash with the observance of "Lord Mayor's Day"), makes it pretty clear that if our gracious sovereign continues to occupy the throne for a few years longer a British subject who is not a "Sir" will be almost as rare as an American citizen who is not a "Colonel." The "fountain of honor" has played so freely that the newspapers have evidently found it difficult to discover at short notice who the new Knights and Baronets are. Not all whom the glittering water has sprinkled have been so thoughtful as one of the decorated persons who sent round to the newspaper offices a printed account of himself and his achievements. Among those whom the King has delighted to honor there are very few members of the medical profession. The most prominent of them are Dr. Thomas Stevenson, our best known toxicologist, and Dr. Constantine Holman, whose devoted work for the furtherance of the interests of the profession has long made him a conspicuous figure in the medical world. His business capacity and his tact in dealing with men have enabled him to save more than one of our medical charities from imminent ruin; to him it is mainly owing that Epsom College, which was little better than a fourth-rate charity school for the sons of men who had failed in the profession, has been transformed into a school giving an education as good as any to be got in this country, and rivaling in the number of academical distinctions won by its pupils the foremost schools of England. For half a century he was one of the leading spirits of the British Medical Association, which he helped to carry through more than one crisis. The reforming party, headed by Sir Victor Horsley, who for the last year or two has ruled the destiny of that body, looked upon Dr. Holman as the incarnation of the *ancien régime* and took the first opportunity of getting rid of him. Apart from this professionally insignificant faction, the distinction bestowed on Dr. Holman will be hailed with satisfaction by his brethren. The honor is all the more remarkable as the man on whom it it is conferred has never been anything but a general practitioner, a class on which the sun of royal favor very seldom shines.

The British Medical Association is to hold its annual meeting this year at Oxford. There seems to be every prospect of a successful gathering. The University will be in vacation at the end of July, when the pundits of British medicine will meet, but some of the official magnates will remain to do them honor and show them hospitality. Honorary degrees are to be conferred on some of the men of light and leading in the medical profession, and naturally there has been a difficulty in selecting the recipients. When the late Queen Victoria was about to celebrate one of her jubilees, the judges of the High Court met to draw up an address befitting

the occasion. The first draft made the oracles of the law describe themselves as "Conscious of their own unworthiness." This was objected to by those who had a proper sense of their own merit, and the late Lord Chief Justice Bowen suggested as an amendment, "Conscious as we are of each other's unworthiness." Doctors are not less conscious of each other's unworthiness than judges, and the authorities are having much trouble in deciding as to the claims of rival luminaries of medicine. The beauty of Oxford and the historical and other associations that make it almost a sacred place for Englishmen are sure to attract a number of members to the meeting. The arrangements are excellent. Each section is to have a college apportioned to its use, and the chief University buildings are set apart for the general meetings. The program of scientific work includes most of the questions that now agitate the medical mind, and the list of entertainments offers the assurance that members will find abundant opportunities of distraction after their serious labors.

The Regius Professorship of Medicine, which became vacant in the early part of the year through the resignation of Sir John Burdon-Sanderson, still awaits a new incumbent. The appointment is in the hands of the "Crown," that is to say, of the Prime Minister, Mr. Balfour. The explanation of the delay in filling up the chair is doubtless to be found in the conflict of opinion which is known to exist among the principal advisers of the Crown. There are two parties among those who have an interest in the medical school of Oxford: one composed mostly of physicians attached to London hospitals, who naturally are not anxious that the University should divert students from the schools with which they are connected; the other, eager to make Oxford a living school of medicine. The former wish the Professor to be a dignified figurehead; the latter desire to see the Chair of Medicine, which, as far as the teaching of medicine is concerned, is little better than a sham, converted into a chair of pathology, for the teaching of which Oxford offers abundant opportunities. It is the eternal battle of the new with the old. Which will conquer? The ideal solution would be that a chair of pathology should be adequately endowed, but at present the University has no funds available for the purpose. It is said that a wealthy person is prepared to play the part of pious founder by bequeathing a sufficient sum. But he is not yet dead and apparently has no immediate intention of going over to the majority.

An action at law tried within the last few days in the High Court of Justice throws a lurid light on the fierce struggle for life which is the lot of medical men practising in the poor districts of London. It was stated in evidence that there are doctors who will give advice and medicine for twopence, if the patient calls on them; if the doctor has to visit the patient the charge is fivepence! Sixpence a visit with medicine thrown in is a comparatively high fee. There are doctors who will attend a patient at his own home and supply him with physic for an inclusive charge of three shillings and sixpence a week. And these are not starving young doctors who, like a man whom I knew, keep themselves alive through the winter by drinking cod-liver oil in their own dispensaries, but prosperous traders who drive about in carriages. It is likely enough that the advice and the physic in many cases are together not worth more than the twopence at which the vendor values them, but the wonder remains how a man can make a living on such a scale of fees. Can it be wondered at that the medical profession does not stand very high in public opinion when its own members rate their services so low? The cause of this state of things can be expressed in one word—*overcrowding*. Congestion leads to overcompetition and this necessarily leads to what shopkeepers call "cutting." The question is an economic one which might be left to settle itself in accordance with the laws of the "dismal science." But political economy affords no remedy for the mischief done to an honorable profession by its degradation to the most ignoble of trades

While doctors strive to live on the wages of a crossing sweeper, there is a bonesetter in Scotland who is said to be making $500 a day. Some of the newspapers have suddenly discovered this modest philanthropist and are making it their business to spread his fame abroad. They vie with each other in sensational accounts of his performances with large headings like, "A Scottish Lourdes," "A Cripples' Mecca," and so forth. Never was bonesetter more trumpeted. Not Lorenz himself was more blatantly advertised, and one is almost tempted to see a nemesis in the fact that the Scotch bonesetter is declared to practice a "bloodless surgery" more successful than that by the Vienna professor. The newspapers give pictures of crowds of the lame and the halt besieging the shrine of the healer of cripples; but they do not give illustrations of the crooked backs on which he has operated, or of the dislocated bones which he has "put back into their place." The credulous scribes told off to recount the wonders worked by the "collier surgeon" differ widely as to his methods, but all agree that he has the "healing touch." They say nothing as to his failures and are careful to say little even of his successes; what they lay stress on is the number of deluded people who flock to him from a distance—for it is a curious fact that his own neighbors appear to have no belief in his thaumaturgic "touch"; and of the fees which he receives. Needless to say, no expert attestation of his wondrous "cures" is forthcoming. That, however, will doubtless be attributed to the jealousy of the doctors. It is a commonplace story. One only wonders with Mr. Crumples how these things get into the papers. The mention of bonesetting reminds me that one of the leading hierophants of the cult, "Professor" Atkinson, who died not long ago, has left only a trifle over $4,000. Yet he had an immense practice, not like his Scottish brother practioner, among poor people, but among the richest in the land. Some of the leaders in our surgical Israel did not disdain to meet him in consultation—of course privily and under seal, as Bobadil says. The profits of bonesetting would seem to be as unsubstantial as its "cures."

Sir William Turner, the President of the General Medical Council, will shortly resign that office. Till about two years ago he was Professor of Anatomy in the University of Edinburgh and he has now been elected principal of that seat of learning, a dignified post to which a considerable salary is attached. The honor of presiding over the deliberations of our Medical Parliament is a very barren one, and although Sir William Turner has ruled the assembly with a strong hand he has doubtless found the strain somewhat severe. The Council has managed to get at loggerheads with most of the Universities and Colleges in the three kingdoms. The London Colleges of Physicians and Surgeons openly defy its authority, and there is a growing feeling in the profession that the Council, as John Morley once said of the House of Lords, requires to be mended or ended. The choice of a successor to Sir William Turner will not be altogether easy. The names of Dr. Donald MacAlister, who represents the University of Cambridge, and Dr. Pye-Smith, who represents that of London, are mentioned. The former, who had a very brilliant academical record and who represents the largest medical

school in England, is an excellent man of business, and would make a tactful and efficient president; and the latter, who was for many years physician to Guy's Hospital, would fill the presidential chair with dignity. There is a possibility, however, that one of the representatives of Ireland may be chosen by way of saving the Council from an Irish grievance.

SOCIETY PROCEEDINGS.

THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE.

Seventh Regular Meeting, held May 18, 1904.

The President, S. J. Meltzer, M.D., in the Chair.

Members Present.—Adler, Burton-Opitz, Dunham, Ewing, Gies, Jackson, Levene, Lusk, Meltzer, Murlin, Richards, Salant, Wadsworth, Wallace, Yatsu.

Members Elected.—P. B. Hawk, W. G. MacCallum, A. R. Mandel, R. M. Pearce, Franz Pfaff, William Salant, H. U. Williams, A. S. Warthin.

ABSTRACTS OF REPORTS ON ORIGINAL INVESTIGATIONS.[1]

The Lecithin Content of Fatty Extracts from the Kidney (preliminary report).—By E. K. Dunham. Rosenfeld has shown that the percentage of the alcohol-chloroform extracts from the dried kidneys of dogs, both normal and "fatty," fluctuates within very narrow limits. He calls these extracts "fat," and regards the microscopical examination as entirely untrustworthy for gauging the amount of fat in the kidney. His work on other organs has led him to the conclusion that, when the fat content is increased in the cells, it has been transported from the fat-depots of the body. It appeared to the author of interest to compare the extracts obtained from the kidney by Rosenfeld's method with similar extracts from the depot-fats. It was at once evident that they differed markedly in the percentage of phosphorus they contained, as is shown by the following analytic results:

Alcohol-chloroform Extracts.	Percentage of Phosphorus.
Human kidneys (mean of 28 analyses)	1.3849
Panniculus adiposis (4.2288 grams	0.0026
Perinephritic Fat (5.6750 grams)	0.0069

The extract from the kidney contains from 200 to 500 times as much phosphorus as the extract from depot-fat. These facts suffice to show that the two extracts are not directly comparable and to throw doubt upon the idea advanced by Rosenfeld that the fat in "fatty" organs is a simple infiltration from the depots of the body.

The phosphorus in these extracts was found to be wholly organic in character. Protagon could not be detected even in 400 grams of the tissue. The quantity of jecorin that may have been present was too small to materially influence the analytical results. The most probable compounds containing the phosphorus are forms of lecithin. The barium hydroxide-platinic chloride method for the separation of cholin was employed with the following results:

	Extract. Grams.	Phosphorus. Percentage.	Platinum. Grams.	Lecithin in the Extract (Calculated as Distearyllecithin.) Percentage.
I.	0.4600	1.43	.....	37.23
	0.4600	1.47	.....	37.45
	1.5859	.....	0.0650	34.50
II.	0.6032	1.12	.....	29.11
	0.6032	1.11	.....	28.99
	2.1556	.....	0.0711	27.40

[1] Proceedings reported by the Secretary William J. Gies, Ph.D., of New York. The authors of the reports have furnished the abstracts. The secretary has made only a few abbreviations and minor alterations in them

Before incineration, in the first case, the platinum salt in the crucible weighed 0.2009 gm. The platinum, therefore, constituted 32.7 per cent. of the salt. Cholin platinic chloride contains 31.6 per cent. of platinum. It appears highly probable, however, that some of the platinum salt was decomposed during the concentration of its solution with heat. It is also possible that some of the cholin suffered decomposition, or was lost, in the manipulations preceding its precipitation with platinic chloride. With these considerations in mind, the foregoing results render it highly probable that the phosphorus is present in some form of lecithin, but, although these calculations are based on distearyllecithin, it is certain that this is not the only lecithin present. The fact that lecithin obtained in moderate purity (about 99 per cent.) from the kidney extract promptly blackens with osmic acid, indicates that the oleic acid radicle is present. The recognition of this fact would make but trifling changes in the calculations in this report. The foregoing analyses appear to justify the conclusion that one may, at least tentatively, assume the phosphorus content of the extracts obtained to be dependent upon the presence of some form of lecithin. Upon this assumption, the calculations given in the following table[1] are based:

	Extract. Percent. of Dry Organ.	Phosphorus. Percent. of the Extract.	Lecithin. Percent. of the Extract.	Lecithin. Percent. of Dry Organ.	Autopsy Report. Cause of Death.	Weight of Kidney.
			Human Kidneys.			Grams.
I.	11.42	2.11	55.07	6.29	Pneumonia and hepatic abscess	200
	12.48	2.00	52.03	6.49		
II.	11.44	1.35	35.14	4.02	Tuberculosis	200
XI.	15.40	1.18	30.84	4.76	Moderately fatty kidney	.....
	15.51	1.19	31.09	4.80		
			Beef Kidneys.			
II.	15.02	2.10	54.64	8.21	.....	.....
			Dog Kidneys.			
I.	14.93	2.04	53.29	7.95	.....	.....
			Rabbit Kidneys.			
I.	16.59	2.53	66.06	10.96[1]	.....	.....

[1] 2.24 per cent. of the fresh kidney.

These analyses demonstrate that even in the kidney, which cannot be regarded as one of the fat-depots of the body and which probably plays little, if any, part in the general fat metabolism, the lecithin content must be taken into consideration in any study of the fatty extract. The limited number of the observations here referred to do not justify conclusions bearing upon the question of the nature of the fatty changes met with in the kidney, but it is the author's intention to continue the study of this subject.

On the Phloridzin Test in Bright's Disease.—By P. A. Levene and L. B. Stookey. Investigation of the action of phloridzin in Bright's disease has a theoretical as well as a practical interest. The mechanism of kidney diabetes is as yet imperfectly understood. The original idea that it was due to a change in the permeability of the kidney epithelium has gradually lost support, and instead there is a growing belief in the hypothesis that, in kidney diabetes, the sugar owes its origin to an exaggerated catabolic condition of the kidney. This view was first expressed by one of the authors in 1894. In support of this theory evidence was brought forward to show that in animals with injured kidneys phloridzin fails to bring about glycosuria, or causes it in less degree than in normal animals. However, it is impossible to injure, by means of drugs or by mechanical interference, only one special part of the kidney. In the course of Bright's disease there are known conditions under which the involvement of either the epithelium or of the glomeruli predominates to a very

[1] The author presented a large number of data. The table here given shows only a few examples of the many results obtained.

great extent, and this, of course, enables one to study the seat of the sugar formation within the kidney. The observations of most authors tend to show that when the epithelium of the kidney is injured, administration of phloridzin fails to cause glycosuria, or does so in very slight degree. The authors injected simultaneously phloridzin and methylene blue, and compared the course of the elimination of the dye with that of sugar. The results of their observations in a general way corroborate the statements made by other writers. In acute parenchymatous Bright's disease sugar fails to appear in the urine after the administration of phloridzin. In chronic forms of the disease, when only a trace of albumin can be detected in the urine, and when the permeability of the kidney for methylene blue is normal, there is frequently a diminished sugar elimination (diminished as compared with that in health after injection of phloridzin). In no case was there observed an impaired permeability for methylene blue with a normal sugar elimination, but the contrary was often the case. Levene's modification of Allihn's method was used for the sugar determinations. Further work in this direction is in progress.

Effect of Blood Serum in Pneumonia upon the Heart (Preliminary Report).—By Isaac Adler and Richard Weil. The object of these experiments was to determine whether blood serum in pneumonia has a specific effect upon the heart and, also, whether there is any difference in action between the serum taken *before* and the serum obtained *after* the crisis. The experiments were made upon the heart of the turtle, use of the mammalian heart being impracticable in this connection for many reasons. The fluids to be tested entered the heart through a glass cannula introduced through the right aorta into the corresponding ventricle, passed through the septum into the left ventricle and flowed out through a canula in the left aorta. Care was taken to keep the temperature, concentration and hydrostatic pressure uniformly constant. The veins were all carefully ligated. The small diaphragmatic vein at the apex was tied and cut, the ligature connected with a writing lever and the contractions of the heart thus recorded upon a drum.

Normal human serum acts upon the heart of the turtle as a violent inhibitor, but it was found that in a dilution of 1-20, or, better still, 1-15, it does not differ greatly in effect from "normal saline." All sera were thereupon tested in dilution of 1-20 or 1-15, and the routine of each experiment as ultimately adopted was as follows: Infusion into the heart, (*a*) "normal saline," (*b*) normal blood serum, (*c*) "normal saline," (*d*) serum before crisis, (*e*) "normal saline," (*f*) serum after crisis. In this manner after considerable preliminary experimentation very characteristic tracings were obtained.

Two cases of lobar pneumonia and one case of bronchopneumonia have thus far been studied. The tracings obtained were demonstrated and it appeared from them that the serum in pneumonia before the crisis, at least in the cases tested, acted upon the heart of the turtle as a most violent poison. The contractions at once became extremely weak and slow, and the pauses very long. The serum taken after the crisis gave tracings not very materially differing from those obtained with normal serum.

The Influence of Alcohol on Biliary Secretion.—By William Salant. In the author's experiments fasting or well-fed dogs were the subjects. Operation and collection were conducted in the usual manner. Ether narcosis was employed in every instance without previous injection of morphine. The rate of secretion was studied by comparing the amounts collected during periods of fifteen minutes. The rate of secretion during the first four or five periods was used as a control, at the end of which time alcohol was injected by means of a burette into the femoral vein. Varying strengths of alcohol were used, 4½ per cent., 30 per cent. and 60 per cent. The quantities administered were usually about 4 c.c. per kilo of body-weight.

After the injection of alcohol, it was found in all cases, that the secretion of bile continued to diminish, the diminution in the rate of secretion being, however, somewhat greater than in the two or three control periods immediately preceding the administration of alcohol. Since the much larger quantity of bile of the first and second periods probably represents bile that has been held back during the operation, it could not be considered as a control. The author therefore regarded as a control the rate of secretion during the following two or three periods. Whether this slightly diminished secretion is to be ascribed to the influence of alcohol can only be decided by further comparisons of the rate of secretion in alcoholized and normal animals. Thus, in three dogs without alcohol the rate of secretion corresponding to the alcohol periods was as follows: A decline during the fourth, fifth and sixth periods, succeeded by a rise in the next period. In the second experiment the rate of secretion remained practically steady during the fifth, sixth, seventh, and eighth periods. In the third experiment there was a variation but the average rate of secretion was about the same in the fifth, sixth, and seventh periods, as in the preceding two. It would seem therefore that the diminished secretion following the intravenous injection of alcohol might be due to the effect of alcohol.

A study of the effect of alcohol on biliary secretion after injection into the stomach was also begun. It would seem *a priori* in the light of recent investigations by Bayliss and Starling, Fleig, and Henriot, on the relation of secretin to the secretion of bile, that the author's method of administering alcohol ought to provoke secretion of bile. In the few experiments the author has made thus far he has observed that when 60 per cent. alcohol was introduced into the stomach there was a slight transitory increase of biliary secretion. With 30 per cent. alcohol, there was in some cases an increase, in some a decrease of the secretion of bile as compared with prealcoholic periods. At this stage of the work it would be premature to form any conclusion regarding this point. Whether this slight increase is due to increased gastric secretion and consequent formation of secretin or is reflex in nature will next be investigated.

The Influence of Repeated External Hemorrhages on the General Composition of the Blood.—By G. M. Meyer and W. J. Gies. Various observers have noted the fact that the composition of the blood changes after hemorrhage, but no systematic study has been made of these modifications. The authors have begun such an investigation for the purpose of establishing a more definite basis for comparative blood analysis. They reported the results of their observations on posthemorrhagic changes in the percentage content of water, total solids, organic solids and ash. Further study is in progress. Healthy, well-nourished or fasting dogs, in light morphine-atropine narcosis were used and quantities of blood ranging from 0.2 to 1.0 per cent. of body-weight were taken. These amounts were drawn from the femoral artery and approximately the same quantity was taken in each experiment at regular intervals, varying from fifteen minutes to two hours, until death ensued. In one experiment a continuous fatal hemorrhage was effected and the blood analyzed in portions. Thus far twenty experiments have been carried out.

In some of them the serum was also analyzed. The following conclusions were reported: Hemorrhage causes increase of water and decrease of solids in the remaining blood. *Hemorrhages of about 0.6 per cent. of body-weight* cause little or no change in general composition of the blood until after 2.5 per cent. has been taken. Under the conditions of these experiments it was generally found that the longer the intervals between withdrawals the less the maximal differences between composition of the first and last fractions. Short intervals between bleedings, all other conditions being equal, favored the largest total withdrawals before death ensued.

The differences in the serum ran parallel with those in the blood, but were less marked. The ash did not vary much in either the blood or serum, no matter how much blood was taken. The blood ash and that from the serum were practically the same in relative amount, though different in composition.

When *small* quantities of blood *equal to about 0.2 per cent. of body-weight* were removed at intervals of about a half-hour, little change was noted in either blood or serum until after 3 per cent. had been taken. After this quantity had been lost the changes following further hemorrhage were such as usually occur. The maximum differences in percentage composition of the first and last fractions varied somewhat. The differences in the amounts of solids, for example, ranged from 1.5 to 3.5 per cent. In *fasting animals* the influence of hemorrhage on chemical change in the remaining blood was somewhat more marked than in well nourished ones. The effect on the serum was about the same. Other influences in the experiments were carefully controlled. The observed effects were due only in slight degree to the narcotics and the conditions attending the operations.

Demonstration of a New Portable Sphygmomanometer.—By T. C. Janeway. Dr. Janeway's instrument was designed with the object of securing a thoroughly portable clinical sphygmomanometer, in which nothing essential to accuracy should be sacrificed. It employs the method of circular compression of Riva-Rocci and Hill, with the 12 cm. width of armlet proved necessary by Von Recklinghausen. The special construction of the cuff allows of adaptation to arms from 15 to 34 cm. in circumference. The original feature of the instrument is the folding U-tube manometer. This is a jointed U tube manometer (copied from Cook) fastened to the under surface of the box-lid, so arranged that, when closed for carrying, it measures 10¼ x4⅝x1⅞ ins., and, with armlet and inflator, weighs 2½ lbs. The manometer is perfectly secure when closed and stands firmly when open. The tube-caliber is 3 mm. The sliding scale is empirically graduated for each instrument, to compensate for variations in the glass tubing, and is accurate. All connections are of heavy pressure tubing. For inflation a Politzer bag is used, as by Erlanger, except that one with valve is necessary to fill the large armlet. The gradual release of pressure is provided for by a stop-cock, with needle-valve of special construction, the work of Mr. Charles E. Dressler, who is making the sphygmomanometer for sale. The method of use, as of the other modern sphygmomanometers, is based on the criterion of the return of the pulse after obliteration (Vierordt), for systolic pressure, and is similar to the Riva-Rocci and its modifications. A fair approximation of diastolic pressure may also be obtained in most cases, using the criterion of maximum pulsation (Marey, Mossi). This is especially useful in cases of aortic insufficiency, or marked hypertension. For experimental work upon the systolic and diastolic pressures, it cannot compare with Erlanger's more elaborate and costly instrument, but aims to serve the clinician by providing him with an accurate, yet not bulky or expensive apparatus for general use. Stanton's sphygmomanometer, which appeared after this one had been begun, answers the same purposes. The only criticism to be made of it is that 8 cm. width of armpiece does not afford a guarantee of complete accuracy on arms that are large and excessively fat.

Demonstration of Cytological Preparations.—By Naohidé Yatsu. Mr. Yatsu exhibited seven preparations, demonstrating important cytological structures found both in eggs normally fertilized and in those treated chemically. He spoke on the achromatic figure in mitosis, with special reference to the morphology and cycle of the centrosome.

Preparation No. 1.—Metaphase of the first polar mitosis with two centrioles at each pole (egg of *Cerebratulus*).

Preparation No. 2.—Sperm nucleus with sperm aster, in which each daughter centriole has acquired a new system of rays (egg of *Cerebratulus*).

Preparation No. 3.—Anaphase of the first cleavage mitosis, showing two centrioles in each centrosome (egg of *Cerebratulus*).

Preparation No. 4.—Telophase of the first cleavage mitosis, showing typical centrosomes (egg of *Ascaris*, Prof. Wilson's preparation).

Preparation No. 5.—Mitosis without chromosomes in a late blastula (egg of *Asterias*, unfertilized and etherized). In one of the blastomeres the aster is dividing forming a typical central spindle but devoid of chromosomes.

Preparation No. 6—Cytasters (egg of *Asterias*, unfertilized and etherized). Many cytasters are found in the cytoplasm, some dividing, some forming synthetic triasters.

Preparation No. 7.—Cytasters (egg of *Cerebratulus*, unfertilized and treated with a solution of calcium chloride). Many cytasters have appeared, the first polar mitosis being disturbed.

The Influence of Subcutaneous Injections, and of Instillations, of Adrenalin upon the Pupils of Frogs, with Demonstrations.—By S. J. Meltzer and Clara Meltzer Auer. Many observers have established the fact that subcutaneous injections as well as instillations of adrenalin exert no influence upon the width of the pupil in normal mammals. In a series of experiments published recently by the authors of this report it was shown that from twenty-four to forty-eight hours after the removal of the superior cervical ganglion a subcutaneous injection or an instillation of adrenalin caused a considerable dilatation of the pupil, which lasted an hour and longer. In the present communication the authors report that in frogs a subcutaneous injection or an instillation of adrenalin into the conjunctival sac causes an unmistakable dilation of the pupils of a normal animal. The dilation lasts a good deal longer than was ever observed in mammals even after removal of the ganglion; after instillation some dilatation may be perceptible as long as thirty-six hours. The maximum dilatation may even continue as long as twelve hours after injection.

When the cord is severed just below the medulla oblongata the pupils usually become small and ellipsoid in shape. A subcutaneous injection causes them to become wide and round. Instillation has the same effect. Finally the effect of instillation can be well observed also on the excised eyes, even when the adrenalin is applied some hours after excision, provided the eyes are kept moist. The experiments were demonstrated by Dr. Meltzer.

THE GERMAN SURGICAL SOCIETY.

Thirty-third Congress, held in Berlin, April 6 to 9, 1904.

Suture in Arterio-venous Aneurism.—Körte demonstrated a case of arterio-venous aneurism which had disappeared completely after a vessel suture. Franz has observed a similar case and conducted some experiments which show that the arterial blood may extend into the vein far beyond the knee joint, when the popliteal vessels are affected.

Action of Fluoride of Sodium on Bone.—By feeding young dogs with fluoride of sodium, v. Stubenrauch was able to induce a typical early caries of the teeth, great porosity of the bones of the extremities, but no retardation of growth. In very young rabbits there was retarded growth, caries of the teeth and necrosis of the jaw. As soon as the administration was stopped, the pathological process came to an end.

Carcinoma by Implantation.—According to Petersen, carcinoma cells may become separated from the mother tumor and start a new growth after short or long-continued contact with serous or epithelial surfaces or wounds. A close microscopical examination will often, however, show that inoculation does not take place but that the cells are carried to their new location by retrograde lymphatic transport. Epithelial inoculation is very rare in the same person and still more so from one individual to another. The slow or rapid recurrence of carcinoma is determined by the variety and malignancy of the primary tumor. Jordan has observed a case of recurrence after extirpation of the tongue for carcinoma after 19 years. In another case of mammary carcinoma, a nodule formed 15 years after amputation.

Pneumatic Chamber for Intrathoracic Operations.—The chamber constructed by Sauerbruch enables the operator to overcome the difference between intrabronchial and intrapleural pressure. An attempt was also made to equalize the pressure by increasing the pressure in the air-passages. Thus in animals, the lungs may be inflated from a bronchus and the bronchus then tied off; if the thorax be then opened, the lung will not collapse and a pneumothorax will not set in. For man this procedure is too radical and has not yet been tried, but it is invaluable in physiological experiment. Von Mikulicz emphasizes the ease with which extensive thoracotomies may be performed in the chamber and believes that difficult operations on the heart and intrathoracic esophagus will now be possible. The results on animals were very gratifying, but one patient died of cardiac collapse. The necessary minus pressure should correspond to 12 millimeters mercury. Brauer objects to the cumbersome and expensive chamber of Sauerbruch and has constructed a small box, holding no more than ½-¼ cubic meters of air, which he thinks is equally efficient. The head of the patient to be operated is brought into the box while the anesthetist introduces his hands through rubber cuffs. With the aid of a special apparatus, anesthesia can easily be induced. Petersen has seen animals revive immediately after pulmonary and cardiac collapse, when the pneumatic chamber was employed. The frequent repetition of the experiment seems to be an intense cardiac stimulant. He was able to remove a strip of lung tissue, the seat of a malignant growth starting from the spine, with perfect success, but when the dressing was changed without the pneumatic chamber, pneumothorax and death resulted.

Experiences with Cardiolysis.—During the last year, v. Beck has performed cardiolysis three times with good result. In one case, ascites, congestion of the liver and of the spleen, disappeared after resection of the 4th, 5th and 6th ribs and the boy was discharged absolutely cured. However, his condition during the first three days after operation was miserable. In the two other cases, the pericarditis had also developed after pleurisy and retraction of the thoracic walls was pronounced. It is necessary to remove the periosteum very freely so that the ribs will not reform.

Röntgen Therapy in Carcinoma.—That Röntgen rays have a beneficial influence upon neoplasms is unquestionable, for Perthes reports 12 cures in 13 cases of epithelioma. One carcinoma of the lip was cured after a single sitting of 25 minutes. Growths seated deeper than two-thirds centimeters are not influenced, however. The specific action seems to manifest itself in a cessation of cell-division; this can be experimentally demonstrated on ova or plant cells. Lassar believes that the best results in cancroids are obtained by combining Röntgen therapy with the use of arsenic.

Five New Operations on Liver and Gall-Ducts.—Kehr reports one case of apparent stone in the cysticus which turned out to be an aneurism of the hepatic artery. The sac was extirpated without the development of necrosis in the liver. The old opinion, that the hepatic artery should not be touched surgically, is thus no longer tenable. The second case concerns a tumor of the common and hepatic ducts. Both ducts were resected and the stump of the hepatic duct then fixed to the duodenum. This is the first case of resection of the common duct on record. In the third case hepatico-cholangio-enterostomy was done but the patient died after several weeks. In the fourth case a defect in the duodenum resulted which necessitated complete division of the duodenum, suture of the divided ends and gastro-enterostomy. A fistulous tract resulting from a retention cyst of the pancreas was implanted into the gall-bladder in the last case, and this followed by a gastrocystotomy, The pancreatic juice was well tolerated by the stomach.

New Formation of Gall-Bladder.—Seven months after the gall-bladder had been extirpated in animals, a new-formed reservoir was found by Haberer at the site where the cystic duct was ligated. When the cystic duct was also resected, the hepatic duct formed a slight dilation.

Removal of Stones in the Choledochus.—Kraske emphasizes the difficulties of choledochotomy, especially if the stone is situated in the intestinal end of the duct. It is especially hard to push the stone toward the liver and too energetic efforts may lead to injury and necrosis of the duct or the intestine. A case of this kind observed by the speaker died of inanition five weeks after the operation. It is often better to mobilize the duodenum and incise it. Injuries to the pancreas should be avoided though they are not always dangerous. The pancreas may, however, cause considerable trouble if the stone is situated in the diverticulum of Vater. In a case of this kind the choledochus was divided close to its entrance at the duodenum, to enable the extraction of a large stone. The sutures held for three days; after that the pancreatic juice was excreted in such large amounts that the patient died of inanition. It is questionable whether an accident of this kind can be prevented by drainage of the pancreatic duct; at any rate, drainage from the choledochus without opening the duodenum is simply impossible. In stones of the choledochus, Riedel makes a very large incision from the lower end of the sternum to below the navel. This enables him to pull forward a large portion of the liver and thus gives ready access to the deeper structures. Rehn believes there is a condition which closely simulates aneurism of the hepatic artery; he refers to hemorrhagic infiltration of the gall-bladder. Kausch warns against duodenal incisions and prefers to open the hepaticus, since if the suture does not hold here, the worst accident is a biliary fistula, whereas with a leak from

the duodenum the patient generally dies. The incision of Riedel is not to be recommended, on account of subsequent hernias; an incision following the course of the nerves is to be preferred. Kehr prefers the transduodenal route; he has had only two deaths among 20 cases. If the tampon is introduced some distance from the duodenal wound, there is little danger of decubitus. If the retroduodenal route is chosen, phlegmons are liable to develop.

Injuries of the Hypophysis.—Injury to the pituitary body may be expected after fractures of the base of the skull running through the sella turcica, with foreign bodies which penetrate the hard palate and skull from the mouth and after injuries, gun-shot or stab wounds which start from the convexity. Since most of these cases are fatal, little is known of the symptomatology. Madelung observed a girl nine years old who had been shot in the head; there were unilateral amaurosis, the remains of hemiplegia and an enormous adiposity. The course of the bullet was such that the hypophysis or its surroundings were probably injured.

Stolper remembers a case of pronounced acromegaly after severe fall upon the back of the head. At the autopsy the hypophysis was considerably enlarged and edematous and a metastasis was encountered in the right occipital lobe. Benda thinks that acromegaly is seen more often with hyperplasia of the gland than with a degeneration such as one would expect after a trauma. Experiments on extirpation of the hypophysis conducted by v. Eiselsberg were all unsuccessful, since the animals died soon after operation.

Psychical Disturbances with Abscess of Temporal Lobe.—In a case of temporal brain abscess, Borchard noticed severe psychical disturbances of a sexual nature. After incising the abscess, the symptoms disappeared.

Bone Suture in Subcutaneous Fractures.—In fractures of the elbow-joint and of the head of the radius, where the broken ends were not in apposition, König warmly advocated bone-suture. This also applies to multiple fractures of the same bone, to certain fractures of the neck of the femur which usually do not heal by bony union. In the latter an accurate suture of the capsule and soft parts is also necessary. This operation will be followed by good results even in advanced age.

Osteoplastic Repair of the Entire Diaphysis.—In a young girl, the entire diaphysis of the femur was removed for myelosarcoma. Friedrich replaced the defect by a portion of the tibia of an older child and achieved excellent functional results. In another similar case, the femur of a patient who had died of cancer of the stomach, was implanted with equal success. The implanted bone merely acts as a framework, permitting the newformed osseus tissue from the epiphysis to grow in the proper direction. The bone need not always be fresh but should be thoroughly boiled out and kept in sterile saline solution.

Early Operation in Renal Tuberculosis.—In forty-eight cases operated on by Kümmel, a primary focus was generally discovered somewhere in the body. In vesical tuberculosis a kidney was found diseased and removal of this organ cured the bladder condition. In the early stage, there are neither subjective nor objective symptoms, especially no pain or tumor, but at most a slight cystitis with turbid urine. The diagnosis is here made by ureteral catheterization. Every cystitis in the female is suspicious of tuberculosis if trauma and catheterization can be ruled out. The use of methylene blue injections as an aid to diagnosis is a valuable addition. It is a mistake to consider the modern methods of functional diagnosis as superfluous and difficult. Kronlein gives a report of 51 cases which constituted 30 per cent. of all his renal cases. The female is more predisposed owing to the frequency of cystitis and retention in the real pelvis. Seventy-two per cent. occurred in the third and fourth decade and in 92 per cent. the disease was unilateral. Functional renal diagnosis, though a valuable aid, does not always disclose the condition of the second kidney. Nephrotomy or resection is rarely sufficient; in most instances a nephrotomy is the only operation which gives hopes of permanent cure. Several classes of cases are recognized, such as suppurative and caseous tuberculosis, the diffuse form, the tuberous variety with unfavorable prognosis, and lastly the embolic form. In the latter the diagnosis can sometimes be made, as in the case of a tuberculous man, who suddenly experienced severe pains in the kidney region, gradually increasing in intensity. The speaker believes with others, that all cases of renal tuberculosis are hematogenous in origin. In the 34 cases, the kidneys were affected alone in 12; the lungs were diseased nine times, the bladder twelve times, a joint nine times and four times the entire urogenital apparatus. Twenty-four cases survived the operation longer than eight months; of the remainder, tuberculous lesions in the other kidney were found in only three.

New Operation for Chronic Nephritis.—The weak point of Edebohl's operation lies according to Babes in the reposition of the denuded organ into its non-vascular, fatty capsule, so that the chances for collateral circulation are very poor. The following methods have been tried on animals and are recommended as superior: 1. Covering the decorticated organ with omentum. 2. Intraperitoneal dislocation. The first method was tried once in the operating room but unfortunately the patient succumbed to a pneumonia.

Experience with Decortication.—P. Rosenstein, of Israel's clinic, thinks that Edebohl's operation is not only without result but actually dangerous in severe cases of nephritis. Edebohl's statistics do not bear severe criticism and his unilateral cases are certainly not unilateral. Israel himself has never seen a permanent cure. Stern, Riedel, Kümmel and Franke have had the same experience.

Increasing the Resistance of the Peritoneum Against Infection.—There seems little doubt that by increasing the number of leucocytes, a higher resistance on the part of the peritoneum against infections can be obtained. Von Mikulicz therefore injects a two per cent. solution of nucleic acid twelve hours before the operation since a hypoleucocytosis precedes the hyperleucocytosis. The course of the disease after operation seemed more favorable than without injection. The leucocytes are also increased by thoroughly flushing out the peritoneal cavity with a hot saline solution—a method which is certainly preferable to the dry way of operating.

Pathogenicity of Intestinal Contents.—Brunner finds that the contents of the lower portion of the gut are much more infectious than the upper and the contents of the vermiform appendix seem to be especially virulent. In the majority of cases the streptococcus was found.

Position for Peritonitis.—In purulent peritonitis, Küster rests his patients with a roll under the chest and pelvis and a support for the head, so that the arms remain freely movable.

Subcutaneous Feeding in Surgery.—In inflammatory processes of the peritoneum and in protracted vomiting it is often impossible to feed the patient in the normal way and subcutaneous feeding, if efficient, would be life-saving. Friedrich has had excellent results with sterilized olive oil up to 100 grammes daily and with 40 to 100 grammes of glucose in three to five per cent.

solution. A higher concentration is not deemed advisible since the injections are very painful and the solutions are no longer isotonic with the blood. Recently, various proteids were again tried. Only an absolutely pure pepsin-peptone seemed serviceable since it did not affect pulse, temperature or blood pressure and in doses of 20 grammes daily, did not appear in the urine. It is the best injected in seven per cent. solution, combined with salt and glucose. Many cases of peritonitis, gastric and intestinal perforation could be tided over the critical period by means of these injections.

Volvulus in the Stomach.—It is hardly recognized that the stomach may undergo torsion like the intestines. Borchard even speaks of two varieties: intracolic volvulus, where the colon participates, and supracolic volvulus, where the stomach alone is affected. Suggestive signs are meteorism involving only the epigastrium, singultus and negative result after examining with sounds. The therapy is very simple: the stomach must be brought back into the normal position, after its volume has been reduced by incision.

Glycogen Reaction of Leucocytes.—The demonstration of glycogen granules in leucocytes by means of the iodine reaction seems to have no diagnostic value except in tuberculosis where the pure forms can be easily distinguished from the mixed infections. However, Küttner thinks that the prognosis may be regarded as very poor if the reaction is strong, even where the number of leucocytes is not above normal.

Proper Time to Operate for Appendicitis.—Karewski believes that all cases of acute appendicitis result from chronic processes which have been going on in the interior of the appendix for a long time. Operation is indicated in all cases in which a chronic intestinal catarrh is in all probability of appendicular origin and internal treatment does not cure. The first acute attack also calls for the knife, since one can never know how long the process has been going on.

Bladder Trouble in Anilin-Workers.—The great frequency of tumors of the bladder is pointed out by Rehn. Twenty-one cases have come under his observation since 1895, of these three were benign and eighteen malignant. The patients had been employed in the factory from five to twenty-nine years. The prognosis is very unfavorable.

Treatment of Hernias.—In many hernias the relation of parts is so disturbed that it is absolutely impossible to bring the intestines back into the abdomen without prolonging the operation and seriously endangering the patient's life. Madelung thinks that the only remedy in these cases is a fecal fistula with exclusion of small or large pieces of the intestines. In small hernias in children and in adults who refuse radical operation Brodnitz has often seen good results from injections of alcohol.

Ileus of Syphilitic Origin.—Borchard reports a rare case of intestinal obstruction caused by a recent syphilitic tumor at the splenic flexure. The affection was recognized as specific during the operation so that an artificial anus was made and the patient subjected to antiluetic treatment. The cure was perfect and the patient is now free from symptoms.

Cancer of the Stomach and Rectum.—A pathological examination of cancers of the stomach and rectum should always be ordered even when the question of malignancy has been settled, since certain types will always recur, while others will give a fair chance of cure. Petersen then discusses the way these growths extend into the surrounding tissues; in the stomach the lesser curvature is most often affected but the duodenum is by no means immune since its beginning was found involved in no less than 30 per cent. In recurrences, the stomach plays the most imporant part, since recurrences from glands are less common. The opposite holds in the rectum where recurrences are most common in the cellular tissue and the regional glands.

JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY

Regular Meeting held May 16, 1904.

Blood in Pregnancy.—Some recent work on the blood in pregnancy, done in the obstetrical ward of the Johns Hopkins Hospital, was reported by Dr. Thompson. The subject has received a good deal of attention, since the time of Morgagni, but the attention has been confined largely to fruitless discussion. Three conditions have been reported as found; either (1) no change; (2) an increase in the red blood cells and diminution of the hemoglobin; or (3) an increase in hemoglobin and diminution in the red blood cells. Many also have held that the blood condition depends on the general condition and not on the presence of pregnancy. A leucocytosis has often been observed and has been explained as due to a local irritation—a higher count having been found in the blood from the cervix than in that from the thumb. Virchow thought a change in the pelvic lymphatics probably explained the phenomenon, and other observers have connected it with the breast changes where a round-cell infiltration occurs. A fall in specific gravity corresponding to the drop in red blood cells has also been observed. The twelve cases studied and here reported were all negroes but one. All were well and were kept on the same diet. They were followed from October, 1903, to May, 1904, each being examined completely once a month. The red cells were found to be high at the extremes of pregnancy—and an irregular rise as pregnancy comes on was noted. The hemoglobin was low until the seventh month, but at the ninth month averaged 85 per cent. There was a slight absolute leucocytosis, the average count being 9,000. Ehrlich's stain showed practically normal proportions of the different species of leucocytes. The specific gravity was found to be high early in pregnancy, diminishing later, again to rise toward the end. Possibly the changes in the water output, pointed out by Slemmons, may explain this phenomenon. Dr. Emerson, in complimenting the author of this paper on his results, said that what was needed in blood work was not a study of many cases but of a few cases carefully observed and Dr. Thompson's work on the specific gravity of the blood was of particular interest.

Benign Bone Cyst.—Dr. Halsted reported a case of benign bone cyst. The patient, a boy of seven years, had had a fall five years before admission, which had rendered him unconscious and "broken" his left thigh below the trochanter. Three weeks afterward he was walking with a crutch. Some time later the leg was wrenched, the thigh became swollen at its middle, and motion became impaired. There was no crepitus, false motion, or tenderness. Skiagraph showed a swelling reaching up to the head of the femur, having the characteristics of a cyst. Operation was done and a cyst filled with brownish fluid found. The new growth invaded the medullary canal, but was evidently benign and the leg was not amputated, the tumor being excised and the head of the bone enucleated. Pathological examination showed the specimen to contain a good deal of cartilage with several small and one large cyst. Strictly, it was a fibroma though microscopically it looked a good deal like a sarcoma. Islands of misplaced cartilage, as Virchow said, often produce cysts; and if it is remem-

bered how active resorption is in the young the origin of such a tumor is easy to understand.

Gastrectomy.—Dr. Bloodgood reported an operation of this kind, done for an early ulcer or cancer. The patient, a man of thirty years, complained of pain in the epigastrium not confined to one side or the other, but situated in the middle portions and about under the ensiform. There was no rigidity, muscle spasm or tenderness. Operation was done, some inflammatory infiltration of the omental fat found, enlarged glands palpated on the the lesser curvature and a gastrectomy by Billroth's first method done. Recovery was uneventful and the patient is now well. The specimen showed an ulcerated patch on the stomach wall. Dr. Bloodgood said that the statistics of the surgery of carcinoma of the stomach showed conclusively that the cases must be seen earlier if anything is to be accomplished.

Dr. Halsted reported a similar case on which he had recently operated. In this case there was an ulcer palpable through the abdominal wall and the patient had been shown to the students as a most typical case of gastric ulcer. At operation enlarged glands were found on the greater curvature and these were, on section, carcinomatous. Gastrectomy for cancer was done by Billroth's second method. The man is now well, his weight has increased 30 pounds and he eats everything. Dr. Emerson, referring to the chemistry of the gastric secretion in early cases of cancer, said that when a cancer grows on an ulcer the hydrochloric acid varies greatly in amount from day to day, and this fact may be of assistance in early cases.

Pulmonary Distomiasis.—Dr. Emerson, referring to the specimens which he exhibited of the first case of pulmonary distomiasis to be reported in this country, gave a slight account of this condition. The disease occurs with great frequency in Japan, Formosa and elsewhere. The chief, if not the only, symptom is hemoptysis with final death from anemia. Between the hemorrhages the sputum remains rusty. This case shows the value of fresh sputum examination.

MEDICAL AND CHIRURGICAL SOCIETY OF MARYLAND.

Stated Meeting, held May 20, 1904.

Skin Lesions.—Dr. Carey Gamble showed a patient exhibiting skin lesions in connection with visceral crises. The patient was a German, forty-seven years old, who had had smallpox when twelve years of age; no rheumatism and an otherwise negative past and family history. He had, however, had between his ninth and his eighteenth years several attacks characterized by great abdominal pain, distention, vomiting and delirium. The pain usually lasted for four weeks and the delirium occurred on and off during that time. There were no skin eruptions. At eighteen he entered the army and since then had had no illness up to admission except a left-sided pneumonia in 1901. In April he was taken with a dry cough, pain in the right chest and swelling of the right arm. A hemorrhagic rash appeared over the body, there were suppression of the breath sounds, a few râles and kodiac resonance in the right axillary line. Urine was negative. A little later he was taken with great pain in arm and shoulders, vomiting and epigastric pain. The gums became spongy, there was distention of the right side of the abdomen and the patient lost perfect control of the bladder. Albumin, casts and some blood appeared in the urine. There were pains over the heart. The hemorrhagic spots in the back became necrotic and sloughed out, leaving areas of ulceration. The onset of this case was much like appendicitis, but an exploratory operation was not done since the rasn had previously appeared, and because the patient was weak and of an obvious hemorrhagic diathesis surgical treatment was thought unwise. The condition present was that described recently by Osler, who called attention to the group of cases characterized by skin lesions in association with visceral crises.

Dysentery.—Dr. Knox reported a study of 110 cases of dysentery seen at the Mount Wilson Sanitarium. He called attention to the various theories which have been advanced to explain this disease and emphasized the absolutely fanciful nature of "miasms," "summer flukes" and "infectious states of the atmosphere," etc. More accurate knowledge of summer diarrhea has led to a more rational treatment; but the results of Shiga's serum at the Mount Wilson Sanitarium, though not absolutely negative, have been disappointing and prophylaxis seems to offer most. Of the cases studied 83 were under one year and only six over two years old. Most of the cases occurred in July and there was always a sudden increase after a period of excessive heat. Ten per cent. of the children were breast-fed and 24 per cent. had taken condensed milk—significant figures from the standpoint of etiology. The hygienic surroundings of none were ideal. In only four cases were there other children with the disease in the same house. The dysentery bacillus, though never isolated from water, may be carried by it just as the typhoid bacillus which, though impossible to find in water, is carried in that way. Many of the breast-fed and condensed-milk-fed babies in this series had been given unboiled water, and this may have been the source of the infection. The prognosis, as given by a study of the mortality of Dr. Knox's cases, is good after the first year, previous to which time practically all the deaths occur.

Posttyphoidal Psychoses.—Dr. Edsall read a paper on the posttyphoidal psychoses in children. He referred to the great vagueness in the literature as to this subject, the only comprehensive work attempted having been that done by Paris students for their theses. The frequency of this condition, the character of the psychosis and the prognosis are the points of especial interest. As to frequency, the idea among clinicians of its great rarity is an erroneous one—80 cases being easily found in the literature. As to character, it is commonly stated that it is a mania, but Dr. Edsall found in his 80 cases 40 of mania, 18 of dementia and 22 of melancholia. A girl of nine years in his practice with a severe typhoid and living on low diet because of hemorrhages developed delusions and symptoms of meningitis for which lumbar puncture was done. She recovered from the fever, but was left with a psychosis characterized by irrelevant fears, delusions of sight and hearing, exaggerated religious emotion, double personality. Her condition gradually improved. She is now quiet and reflective but otherwise well. As to prognosis, the clinicians usually say that the case will recover, the psychiatrists that it will not. In this series most of the melancholias got well, but 20 out of 65 cases remained persistently insane—the majority being demented. Dr. Edsall feeds his cases well whenever mental symptoms occur, as a prophylaxis against dangerous psychosis. Dr. Mitchell thought there might be some relation between the period of starvation and the incidence of insanity and suggested that studies in metabolism might throw some light on the condition. Possibly sex might be an etiological factor. He reported having seen hysterical attacks after typhoid (aphonia, paralysis, blindness, etc.).

Dr. Reuling said that dementia precox frequently

follows typhoid and every slight psychosis should be carefully watched.

Dr. Futcher called attention to the frequency of a neuropathic family history in the adult cases and suggested that this might be found also in children.

Dr. Edsall said that no relation could be shown between the severity of the disease and the incidence of a psychosis, and that more boys than girls are affected —contrary to what we should expect. The influence of heredity has not been carefully studied, but Morel reported a series of eight children from one family, all developing typhoid followed by persistent psychoses. Four of these were maniacal and four demented.

CHICAGO SURGICAL SOCIETY.

Stated Meeting held May 2, 1904.

Carcinoma of the Cheek.—Dr. Nicholas Senn reported a case of extensive carcinoma involving the left cheek, in the center of which was a perforation which communicated with the cavity of the mouth. Acting upon the supposition that it might be a case of abscess, he decided, first, to curettage, hoping to improve the local condition as well as giving an opportunity to make an early diagnosis by the aid of the microscope. Sections under the microscope showed it to be a case of unusually malignant form of carcinoma that had its starting-point somewhere about the alveolar process on the left side, involved the entire cheek, and gave rise to extensive destruction. There was extensive regional dissemination, although the disease had lasted only three months. A radical operation was resorted to. The entire cheek was removed, leaving the angle of the mouth and a small portion of the cutaneous covering of the cheek. He sacrificed the periosteal covering of the jaw on the corresponding side, and made regional dissection by removing the submaxillary gland with the chain of lymphatics, as a preliminary to excision of the cheek, and covered the enormous defect which was produced by a plastic operation, using Thiersch's skin grafts. The wound healed by primary intention throughout.

Multiple Tuberculous Abscesses.—Dr. Senn reported a case of tuberculosis of the ribs, of a most pronounced type, in a man of forty years of age. Three large tuberculous abscesses involved the left side of the chest. One of these ruptured spontaneously, and a fistulous opening communicated near the nipple with a very large abscess cavity. Another abscess was found at the junction of the ribs with the cartilage near the sternum, and another to the left of the mammary line. The third, fourth and fifth ribs were the seat of tuberculosis. The first abscess was the result of tuberculous perichondritis. The focus of tuberculosis of the fourth rib was almost directly over the pericardium close to the nipple. The third abscess was a little to the left and involved the fifth rib. The ribs were resected in their entirety, necessitating an extensive operation.

Acute Osteomyelitis.—Dr. Senn showed a patient for the purpose of making a few remarks in reference to the clinical behavior of certain forms of acute osteomyelitis.

Cysts of the Ductus Thyroglossus.—Dr. Senn had encountered three cases in two weeks of cysts of the ductus thyroglossus. The patients were all young subjects, eighteen to twenty-five years of age, two females and one male. The cysts were comparatively small. The largest one was about the size of a small walnut. They were located in the median line between the thyroid cartilage and the base of the hyoid bone. The enlargement was slow, accompanied by pain and swelling. The skin was movable over the surface of the swelling in all of the cases. Fluctuation was distinct. Complete excision was resorted to. The cyst wall in one of the cases was as thin as tissue paper.

Fibroma of the Periosteum.—In the last ten days Dr. Senn said he had encountered two cases of fibroma of the periosteum. In the first case the fibroma had its starting-point from the periosteum of the second rib close to the cartilage. The tumor extended over the surrounding bony framework in mushroom-like manner, and underneath the clavicle. The tumor was removed through a curved incision, with its convexity directed upward, and the flap reflected as far as the clavicle, thus laying bare freely the base of the tumor, which he found intimately attached to the periosteum of the second rib near the sternum. The tumor was very firm and smooth, and on making a section it cut almost like cartilage. He removed a second fibroma of the ribs last Friday from a woman thirty years of age, which was situated at the lower part of the scapula. The patient first noticed the tumor eighteen years ago. It became stationary, but later gave rise to serious functional disturbance by fixation of the arm. The tumor was removed.

Verruca Senilis.—Dr. Senn exhibited two specimens from the face of a woman, seventy-one years of age, the subject of multiple senile warts. In both cases the disease involved the malar prominence on both sides. There were a number of these warts scattered all over the face, those over the malar eminence being the seat of repeated irrigations, and had undergone transformation into epithelioma.

Myositis Ossificans.—Valuable as the X-ray is as a diagnostic resource, Dr. Senn said occasionally it leads physicians into difficulties. He related a case briefly in confirmation of the correctness of this assertion. The patient was a colleague upon whom he had operated twice before, once for a diffuse septic inflammation involving the right arm and forearm, and a second time for appendicitis. For a number of months he had complained of a vague pain in the right shoulder. The patient regarded it as a rheumatic affection. Local and general treatment failed to give relief. The pain increased in severity, and the shoulder-joint almost completely lost its function. Dr. Senn could find no indication of any swelling, but found at a point corresponding to about the middle of the base of the deltoid a limited area of tenderness. The X-ray picture showed in the center of the deltoid muscle a dark elongated spot. The shoulder-joint itself was normal. He thought he would make no mistake if he considered the case on the face of the photograph one of myositis ossificans. He thought the dark island represented bone tissue in the deltoid, as it appeared entirely separate from the greater tuberosity of the humerus. Upon this supposition he acted. He laid the deltoid muscle bare by a curved incision, reflected the flap upward, and found the deltoid absolutely normal. In palpating the deltoid he found at a point corresponding to the outer side of the bicipital groove of the greater tuberosity a hard swelling. He separated the deltoid vertically by the use of a director and came down to a hard mass, not bone, but underneath the periosteum it appeared to be encapsulated. He incised and exposed a large mass of inorganic salt-sodium biurate. Dr. Senn also reported two cases of lipoma arborescens. He also exhibited the new army splint devised by Howard W. Beale, and a combined stretcher and splint devised by Professor Stokes.

The Union of Ununited Fractures of the Neck of the Femur by Open Operation.—Dr. Leonard Freeman, of Denver, Colo., read a paper, by invitation, on this subject. He went at length into the literature of this subject, after which he reported a case of his own in a heavy, muscular man, thirty-two years of age, who had injured the right hip by falling on it in 1903. Pa-

tient was up on crutches in about four weeks, the extent of the injury not having been recognized. When he saw him on September 23, 1903, about four months after the injury, the patient was still unable to use the limb in walking, owing to pain in the hip and knee. There was shortening of two and a half inches, with a corresponding elevation of the trochanter, although this could easily be overcome by traction, the manipulation being accompanied by indistinct crepitus. Operation was performed October 10, 1903, about five months after the injury. Anterior longitudinal incision was made external to the sartorius, through which the neck of the femur was readily exposed, and the fracture located near the end of the bone. With difficulty a mass of tough fibrous tissue was snipped with scissors, between the ends of the fragments, which were freshened on each side of the gap with a chisel. A small incision was then made over the trochanter externally, and a hole for the reception of the screw drilled through the base of the trochanter, the external fragment of the neck, and into the head of the bone. The drilling proved to be a mere form, for the bones were so soft that the blunt screw could have been pushed directly through it without the boring of a preliminary hole. When the screw was in place, its outer end projected between the stitches used in closing the wound. Owing to the softness of the bone, the parts, although receiving considerable support, were far from being firmly held, so that it was possible to displace them with moderate force by rotating the limb or pushing it upward. On account of oozing, it was necessary to pack the wound with a strip of gauze, which was removed in a day or two, the opening closed, and primary union obtained. Extension, a long side splint, and a pad beneath the trochanter were employed. For several days the suffering was great, necessitating the constant use of morphine. In a week or so a little infection appeared about the opening through which projected the screw, which at the end of about two weeks caused a rise in temperature to nearly 100° F, accompanied by chills and much general disturbance. On removal of the screw these unfavorable symptoms promptly subsided, showing that they were probably due to infection of the cancellous structure rather than the joint. The subsequent recovery was rapid and uninterrupted. There was about one inch shortening. In the face of various tests, the union seemed to be sound and bony. He examined the patient again, a little over six months after the operation, and found the following condition: Union apparently firm, considerable callus, flexion to nearly a right angle, rotation almost normal, and about one and a half inch shortening. There was still enough pain in the joint anteriorly to prevent the patient discarding his crutches, although it was much less than before the operation, and was decreasing constantly. When not atempting to walk, the weight could be borne upon the limb with but little, if any, discomfort. Up to the present time the case had not been a complete success, the result being marked improvement only. What the ultimate outcome would be was yet to be ascertained.

Dr. Nicholas Senn questioned whether Dr. Freeman had reached an ideal result in his case. In the years 1882 and 1883, the speaker studied this question scientifically. Up to that time it was doubted whether union by bone under any circumstances could be obtained in cases of intracapsular fracture of the neck of the femur. He produced this fracture on the lower animals by drilling the neck of the femur in different directions and fracturing it, satisfying himself in each instance that he had produced a fracture inside the capsule. He treated twenty-three of the animals thus experimented upon by the methods then in vogue, but in all of these cases he failed. He then resorted to direct methods of fixation. Breaking the bone in a similar manner, he made use of ivory bone pegs and metallic nails. In ten experiments following the twenty-three failures he demonstrated that he had obtained bony union in nearly all of them. He found afterward that the same results in the human subject were obtainable by indirect methods of fixation by bringing the fractured surfaces in contact and holding them in apposition by lateral pressure by a splint of his own device. He had treated since that time fifteen or twenty cases, and in the majority of them could not only demonstrate excellent functional results, but union by bony consolidation.

Dr. Arthur Dean Bevan spoke of fracture of the neck of the humerus, and reported three cases upon which he had operated. In these he had made the open operation, wired the fragments, or had resected the head of the bone. He had one case of infection, which resulted in the loss of function of the shoulder-joint temporarily, and endangered the life of the patient for weeks. In the other two cases he obtained union by primary intention, and the results were satisfactory.

Dr. A. J. Ochsner had followed the method of treatment described by Dr. Ruth, in a paper read before the American Medical Association, in sixteen cases, two of which died. There was union in all of them. The amount of shortening in all of them was less than three centimeters. He had made the open operation in one case only of ununited fracture with painful hip. He used two Parkhill screws through the neck and the head, but the result was not satisfactory, as it was necessary suqsequently to remove the head.

Dr. Alexander Hugh Ferguson had treated three cases of ununited fractures of the head of the femur by the open operation with very good results.

Dr. Freeman, in closing, agreed with the speakers that in recent fracture of the neck of the femur the open operation should be avoided. He did not think there was as much danger attending the open operation from infection as Dr. Senn had intimated. Parkhill had used his clamp in fifteen or twenty cases without bad results. Infection, when it occurred, was along the tract of the screw into the cancellous tissue, and in his own case as soon as the screw was removed the infection subsided.

NORTHWEST MEDICAL SOCIETY OF PHILADELPHIA.

Stated Meeting, held April 26, 1904.

The President, Hugh Hanna, M.D., in the Chair.

Internal and External Hemorrhoids was the title of a paper read by Dr. Lewis H. Adler, Jr., in which he urged the necessity for careful ocular and digital examination of all cases suspicious of rectal trouble. He divided, external hemorrhoids into (1) venous, (2) cutaneous, and (3) compound. The first variety being again subdivided into three forms (*a*) a marked varicose condition of the plexus of the external hemorrhoidal veins; (*b*) a thrombosis of the plexus; and (*c*) a clot of extravasated blood due to rupture of a varicose vessel. The internal variety he considered under the forms of (1) varicose, (2) capillary, and (3) compound. In regard to the treatment of external hemorrhoids he noted the fact that it is usually only when the tumors are inflamed that the patient will seek medical advice, and believed the best method of treatment to be operative, if the patient will submit thereto, which may be accomplished (1) by excision, (2) by simple incision, and (3) by excision and primary suture of the cutaneous edges of the primary wound. He stated that excision was the method most frequently employed, which he described in detail, advising that

the hair be not shaven; and recommending the anesthetization of the tumor by a two per cent. solution of hydrochlorate of cocaine injected hypodermatically. Operation by simple incision was also fully considered and the chief objection thereto thought to be that the skin distention occasioned by the inflamed pile is left, and may subsequently become inflamed or refill with blood.

The advantage of simple excision and primary suture of the resulting wound has the advantage hope of obtaining primary union, but the author stated that he had abandoned it because of the liability of infection of the suture tracks, and because he believed the annoyance to be considerably increased by the mechanical presence of the sutures over what it was if the wound was left to heal by granulations. The palliative treatment consists of keeping the parts thoroughly clean by bathing with hot water and the application of soothing and astringent lotions during the inflammatory period, together with careful regulation of the bowels, diet and rest in bed. The treatment of internal hemorrhoids he divided into (*a*) preventive, (*b*) palliative and (*c*) operative. The capillary pile he believed could be best treated by the electrothermic cautery; while he believed that the nitric acid treatment was also worthy of mention. The preventive treatment consists to a large extent in the avoidance of sedentary habits, the use of improper toilet paper (such as newspaper, printer's ink being a decided irritant), excessive venery, improper diet; constipation, and the use of drastic purgative medicines. The palliative treatment should be with a view to (1) the reduction of any inflammation, (2) the arrest of hemorrhage, and (3) the prevention of prolapse of tumors. It includes the various details mentioned under preventive treatment, and in the early stages relief will often be produced by sponging the parts with cold water and in some instances an injection of cold or ice water after a stool. He also considered in detail the formula of Dr. S. G. Gant for the relief of inflamed hemorrhoids and that of Dr. James P. Tuttle for the relief of bleeding. He considered in detail the various operative procedures of divulsion, injection, ligature, clamp and cautery and Whitehead's, stating that he preferred the clamp and cautery method for the reasons that the patients suffer less pain; that recovery is quicker and that the constitutional effects are less.

Diagnosis and Treatment of Fistula in Ano.—This was the paper of Dr. J. Coles Brick, in which he referred to the fact that out of 16,060 treated in St. Mark's Hospital, London, between 1872 and 1891, a large number were of some form of fistula in ano. The consensus of opinion seems to be that fistula in ano is almost invariably secondary to abscess, although congenital cases may exist occasionally. He referred to the cases of this character reported by Dr. Kurt Bartholdy (*Arch. f. klin. Chir.*, LXVI., p. 956, 1902), and also described in detail three cases of suppurating dermoid cyst between the rectum and sacrum reported by Serein (*Med. Obosrenje*, January, 1901), causing this condition and the anorectal sinus of Hermann. As the great proportion of fistulas whose internal openings have been found are at the mucocutaneous junction, he believed a plausible cause to be injury by hard fecal masses to the delicate mucosa at this point and the possible introduction of septic micro-organisms into the lymphatics or Hermann's sinus and then conveyed into the ischiorectal fossa or in some cases higher up in the rectum. No sex or age is free from the disease, although the male during middle life is the most frequent sufferer. Allyngham reports that 14 per cent. of his cases of fistula were tuberculous, although many cases have been seen in which there was no indication of tuberculous ulcer. The primary influence of syphilis is through an ulcerative process. The writer referred to a case in which after curettment and packing of the fistulous tract, granulations did not form. The husband had a specific history and after giving specific treatment the wound began to be more pink, healthy granulations formed and it closed perfectly. He laid stress upon the importance of carefully deciding the etiology of the disease; whether tuberculous or specific, superficial or of deep origin. He referred to the general classification as complete and incomplete, internal and external, and described in detail the method of examination for each variety, laying particular stress upon the importance of a good light and recommending that the patient be placed in the Sim's position with the buttocks slightly elevated by means of a small pillow. Most patients dread such an examination and it should be done with as little pain as possible. A swab of cotton wet in a 10 per cent. to a 20 per cent. solution of cocaine should be introduced into the anus and allowed to remain there a short time, after which the index finger should be introduced and gradual dilatation accomplished. The treatment may be either palliative or operative; the palliative treatment rarely effecting a cure, but simply relieving the condition. In blind external fistula in which the pus is watery, it is the safest, but if there is much induration, burrowing will continue, and the longer the fistula is left the more difficult it is to cure. He referred to the methods of Allyngham, who reports the cure of 17 cases by the use locally of strong solutions of carbolic acid and iodine or chromic acid. Matthews uses the fistulatome, by means of which the fistulous tract is scarified, but he nevertheless prefers the knife; and De Vevey, who uses tri-weekly injections of a 2 to 2½ per cent. of copper acetate solution, keeps the patient in a reclining position, and also administers guaiacol and small doses of copper acetate internally. Of the operative methods of procedure, excision is the most in use to-day, although elastic ligature, electrolysis and ecraseur all have their advocates. Whatever operation is done the patient should be carefully prepared therefor. Free catharsis should be had one and one-half to two days before the operation; a laxative pill should be given the night before and the patient put on a liquid diet. Early on the morning of the operation an enema of hot soapsuds should be given, in order to clear the file of operation from fecal matter. In cases of lung involvement ether should not be used. The bowels should be kept confined for five or six days after the operation, after which an enema of oxgall, glycerin and water may be given, if required. He laid especial stress upon the importance of after treatment, and the cases should be watched until all granulations have disappeared. When the bowels are to be confined for four or five days a rubber tube covered with gauze should be inserted in order to allow the escape of gas.

Dr. Andrew J. Downs stated that he favored the clamp and cautery operation, who stated that he had performed all the various methods for the removal of hemorrhoids, with the exception of the Whitehead operation, which he believed to be disadvantaged by the fact of its length and also by the fact that it was more apt to transmit infection; the operation which was less likely to cause the latter complication being the clamp and cautery, which he does by means of the electrothermic angiotribe, which instrument combined the simultaneous application of heat and pressure, the current being supplied either from a motor or storage battery. He described in detail the instrument and operation and stated that in the last three cases he had left

the button, of tissue, as it acted as an extra sealing, if there was any tendency for the ribband to open. He referred to two cases in which he had recently performed the operation, one case having previously had a difficult hysterectomy, and the other an operation for appendicitis, both of whom stated that they experienced no pain during the operation. The operation can be quickly performed, the speaker stating that he had frequently performed it in eight minutes. In reference to fistula, he believed that the sphincter should be preserved, if possible.

Dr. Wilmer Krusen referred to the importance of carefully examining into the pelvic conditions of women in whom operations for rectal conditions were performed, believing that in many instances the healing was interfered with by some pelvic condition, such as a retroflexed uterus or a pelvic tumor.

Dr. T. Turner Thomas referred to an article which had recently appeared in the *Boston Medical and Surgical Journal*, in which the writer reported 150 cases of the Whitehead operation with no deaths and with only five strictures, the time of the operation varying from five to twenty minutes, with an average of 12½ minutes.

Dr. C. Hershey Thomas reported three case of fistula without any internal opening, all of which healed up very nicely without making any.

Dr. Lewis H. Adler, Jr., in closing, stated that he believed the danger of stricture from cutting the sphincter was an overrated one; and that he had never had a single case of long continued incontinence in any case on which he had operated. He stated that he did not believe too strong solutions of cocaine should be used, as the absorptive powers of the rectum are very high, and that he always used a two per cent. solution. In regard to tuberculous fistula, he stated that there were many cases occurring in tuberculous subjects, in which the abscess was not tuberculous, and that from an investigation he had recently been making he believed that the instances of tuberculous abscess were quite limited. In any event he did not feel that it made much difference if an excision was done.

Dr. J. Coles Brick, in closing, emphasized the value of carefully looking into the pelvic condition, and both relieved if necessary. He believed that a suture inserted at the time of the operation was very valuable, if the patient was so situated that careful attention could be paid to him. In regard to the carbolic acid, he stated that it acted as a germicide and mild irritant. In regard to the use of cocaine, he referred to the case of a man who had by the urethral use of it been overcome; and that he never gave a stronger solution than two per cent. by injection and usually one-half.

BOOK REVIEWS.

THE SUMMER DIARRHEAS OF INFANTS, Their Etiology, Pathology and Treatment. By H. Illoway, M.D. E. R. Pelton, New York.

DR. ILLOWAY'S little book is likely to be of special service during the heated term, because it insists on the fact that the predisposition to the infectious conditions known as summer diarrheas is really a form of themic fever consequent upon the lack of resistance of the child to continued high temperatures. His very practical suggestion is that children should be kept cool by bathing, by the removal of clothing and as far as possible by keeping them out in the open air but in the shade. Other features of summer diarrheas are also suggestively touched, and the book will be useful for those who have many city children to care for during the hot weather.

TUBERCULOSIS AND ACUTE GENERAL MILITARY TUBERCULOSIS. By Dr. G. Cornet, of Berlin. Edited, with additions, by Walter James, M.D., Professor of the Practice of Medicine in the College of Physicians and Surgeons (Columbia University), New York. W. B. Saunders & Company, Philadelphia, New York, London.

THERE is probably no more complete treatise on the general subject of tuberculosis in any language and certainly none in English anything like as complete and so thoroughly up to date as this volume of the Nothnagel series. Professor Cornet's work has well been called exhaustive. The American editor has added not a little of value from the recent literature to what was already an extremely satisfactory treatment of an extensive and difficult subject. Besides new material has been incorporated from some recent standpoints with regard to tuberculosis. For instance, the chemistry of the tubercle bacillus and of changes of media which favor its growth have in recent years occupied much attention and this subject is treated very fully in this volume by Dr. E. R. Baldwin, of Saranac Lake.

At the present time tuberculosis has come to occupy a very prominent place in the mind of the general practitioner of medicine. This is mainly due to the fact that the disease is no longer considered either hereditary and therefore not preventable nor necessarily fatal and therefore hopeless of treatment.

In the present volume the long chapters on the prophylaxis and the therapy of pulmonary tuberculosis are full of practical suggestions that cannot fail to be of the greatest help. Everything new and old has been discussed in the matter of treatment and the conclusion lies in favor of the open air, abundant diet regime shown to be the only rational basis for successful phthisiotherapy.

BOOKS RECEIVED.

INTERNATIONAL CLINICS. Fourteenth series. Volume I. Edited by A. O. J. Kelly. 304 pages. Illustrated. J. B. Lippincott & Co., Philadelphia.

MATERIA MEDICA FOR NURSES. By Emily A. M. Stoney. Second edition. 12mo, 300 pages. W. B. Saunders & Co., Philadelphia, New York and London.

EPILEPSY AND ITS TREATMENT. By Dr. Wm. P. Spratling. 8vo, 522 pages. Illustrated. W. B. Saunders & Co., Philadelphia, New York and London.

PROGRESSIVE MEDICINE. Volume II. Edited by Dr. Hobart Amory Hare. 8vo, 334 pages. Illustrated. Lea Brothers & Co., Philadelphia and New York.

DISEASES OF THE NOSE AND THROAT. By Dr. D. Braden Kyle. Third edition. 8vo, 669 pages. Illustrated. W. B. Saunders & Co., Philadelphia, New York and London.

MEDICAL DIAGNOSIS. By Dr. Wilhelm v. Leube. Translated and edited by Dr. J. L. Salinger. 8vo, 1,058 pages. Illustrated. D. Appleton & Co., New York and London.

DISEASES OF METABOLISM AND NUTRITION. By Dr. Carl von Noorden and Carl Dapper. Translated by Dr. Boardman Reed. 8vo, 89 pages. E. B. Treat & Co., New York.

OBSTETRIC AND GYNOLOGIC NURSING. By Dr. Edward P. Davis. Second edition. 12mo, 402 pages. Illustrated. W. H. Saunders & Co., Philadelphia, New York and London.